THE

PENNY CYCLOPÆDIA

OF

THE SOCIETY

FOR THE

DIFFUSION OF USEFUL KNOWLEDGE.

VOLUME XIII.

INTESTINES——LIMOGES.

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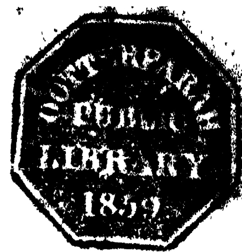
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INTESTINES are that portion of the digestive canal into which the food is received after it has been partially digested in the stomach, and in which its further assimilation, the separation and absorption of the nutritive matter, and the removal of that which is excrementitious, take place. In an adult, the intestines consist of a convoluted tube of from 30 to 40 feet in length, and are, from the difference of their diameters in different parts, divided into small intestines, which comprise about the first four-fifths, and large intestines, which constitute the other fifth of their length. The former again are divided into the duodenum, into which the ducts from the liver and pancreas open, and in which the chyme from the stomach is converted into chyle [DIGESTION; CHYLE]; the jejunum, in which the absorption of the nutritive matter of the food is principally effected; and the ileum. The large intestines are divided into the cœcum, colon, and rectum.

The walls of the intestinal canal are composed of three principal coats or membranes. The exterior, which is smooth and polished, is called the peritoneal, and its principal use is to permit the free motions of the intestines within the abdomen, and of their several convolutions against each other, by rendering the effect of friction as slight as possible. Next to and within the peritoneal coat is the muscular, which is composed of two layers of fibres; an external, in which they are directed longitudinally, and an internal, of which the fibres encircle the intestine. By these the motions of the intestines and the propulsion of their contents are effected; the longitudinal fibres tending to shorten each portion of the canal, while the circular contract its diameter; and the two sets together producing a motion of the tube somewhat like that of a worm, whence it has received the name of vermicular motion. Beneath these layers, and separated from them by a stratum of cellular tissue, which has been sometimes called the fourth or nervous coat, is the mucous membrane, which is the most important part of the intestinal canal. It is everywhere beset by innumerable minute glands, by which the secretion of mucus and the other intestinal juices is carried on. In the small intestines it has a fine velvet-like surface, made up of minute thickly-set hair-like processes, or villi, which are about $\frac{1}{50}$th of an inch in length, and stand up so that their tops seem to form a smooth surface like the pile of velvet. These, as well as all the rest of the mucous membrane, are protected from the irritation which the immediate contact of foreign substances would produce, by a covering of an inorganic cuticle of extreme delicacy, called epithelium.

The principal functions performed by the intestines are the conversion of the chyme [DIGESTION; GASTRIC JUICE] into chyle, the absorption of the latter, and the removal of the innutritious parts of the food and of a considerable quantity of excrementitious matter. In the first process, which constitutes the last stage of digestion, the secretions of the liver and pancreas take an important part: the ducts by which they are conveyed open into the intestinal canal, near the middle of the duodenum, or about six inches from the aperture by which the food passes from the stomach; and immediately beyond the orifices of these ducts the villi are of great size, and thickly set on prominent folds of the mucous membrane, called valvulæ conniventes. These folds, at the same time that they increase the extent of surface for absorption, serve to entangle the semifluid mass of food, now completely digested; they are most numerous and prominent in the jejunum, where absorption is carried on earliest and most rapidly, but are found to a slighter extent throughout the whole of the small intestines.

The absorption of the chyle is effected by the villi, each of which is composed of a minute tube, which is the termination of a branch of the lacteal or absorbent system of vessels, and is ensheathed in a delicate tissue containing a net-work of capillary arteries and veins. The form and function of the villi may be best demonstrated in an animal which has died suddenly after a full meal; they then appear turgid, and stand erect, filled with a whitish milky fluid, the chyle, which, as fast as it is absorbed by them, is conveyed by numerous converging streams into the main trunk of the absorbent system, called the thoracic duct, through which it is gradually poured into the blood of the left subclavian vein, at a short distance before it enters the right side of the heart. [HEART.] The whole process of absorption is not unaptly compared to that by which the fluids are conveyed from the earth through the roots into the stem of a plant; the villi of the intestine being represented by the tufts of hair-like spongioles which are placed at the terminations of the fibres of the root.

The portion of the food which is unfit for the nourishment of the body is forced onwards by the vermicular motion of the intestines, and being mixed with the resinous and other excrementitious substances secreted by the liver and other glands, is conveyed through the whole tract of the intestines; and after it has been exposed to the absorbing vessels, which are placed in greater or less abundance in every part of the canal, so that not a particle of nutriment can be lost, the residue is voided.

INTONATION, in vocal music, is the tuning of the voice—the singing true or false—in tune or out of tune. Correct *Intonation* is the first requisite in a singer: this wanting, all his other musical qualities, however good, are unavailing.

INTRA'DOS and **EXTRA'DOS**, the lower and higher curves of an arch. [ARCH.]

INTRICA'RIA, a small Polypifer from the oolitic rocks of France, allied to Cellaria. (M. Defrance, *Dic. des Sci. Nat.*)

INTUITION (*intueri*), the most simple act of the reason or intellect, on which, according to Locke, 'depends all the certainty and evidence of all our knowledge; which certainty every one finds to be so great, that he cannot

same, and therefore cannot require a greater. For a man cannot conceive of a greater certainty than that any idea in his mind is such as he perceives it to be, and that two ideas, wherein he perceives a difference, are different and not precisely the same.' His definition, or rather explanation, of intuition is as follows:—'Sometimes the mind perceives the agreement or disagreement of two ideas immediately by themselves, and this, I think, we may call intuitive knowledge. In this the mind is at no pains of proving or examining, but perceives the truth as the eye does the light, only by being directed to it.' (*Essay on Human Understanding*, b. iv., c. ii., § 1.) Campbell's definition is similar: having defined truth to be the conformity of our conceptions to their antetypes in the nature of things, he declares intuitive truth to be that 'which is perceived immediately on a bare attention to the ideas under review.'

The nature of the relation which subsists between intuition and reasoning has been strongly contested. While Beattie maintains that the connexion between them, how closely soever they are found in general to be connected, is not necessary, but, on the contrary, a being endued with one may be destitute of the other; Dugald Stewart, on the other hand, insists that the two are not radically distinct, although by most writers they are considered to be different faculties. Locke having rightly maintained that every step which the reason makes in demonstrative knowledge has intuitive certainty, and that consequently the power of reasoning presupposes that of intuition, Stewart thinks that the intuition of Locke implies the power of reasoning; or, at least, that intuition combined with memory explains reasoning. Here his usual sagacity appears to have failed Stewart. While the mind itself is perfectly simple, it has been, for the purpose of attaining accuracy of language and distinctness of theory, supposed to be multiple; and distinct faculties have been ascribed to it according as its several operations comprise more or fewer elements. According therefore to his own account, reason, which involves the element of time, must be kept distinct from intuition, which does not involve that element.

The proper objects of intuitive certainty are identical propositions. This of course does not mean propositions verbally identical: such as 'a man is a man.' But while the object of thought is perfectly and always one, it may present itself to the thought under a variety of aspects, either dissolved into its elements or as combined into a whole. It is this identity under an apparent diversity that constitutes that original and primary evidence which makes certain propositions, as soon as the respective terms are understood, to be perceived intuitively. On the other hand, the apparent identity of a real diversity is the ground of all sophistical argument. The ultimate form of legitimate argumentation is, $a = b$, $b = c$, $\therefore a = c$. But every fallacy, when detected, will invariably be found to be $a = b \pm r$, $b = c$, $\therefore a = c$. The sophistry consists in the suppression of the element r, either positive or negative.

In the philosophy of Kant the term intuition (anschauung) is used to denote the single act of the sense upon outward objects according to its own laws. It appears to be employed in a like sense in the following extract from Glanvil—'Some say that the soul is not passive under the material phantasms; but doth only *intuitively* view them by the necessity of its own nature, and so observes other things in these their representatives.' (*Vanity of Dogmatising*, c. iv., p. 29.)

I'NULA, a genus of composite plants, one of whose species, I. Helenium, is used medicinally. This plant is a native of various parts of Europe, in pastures and woods; it has a thick bitter mucilaginous root, a stout stem three feet high, broad ovate serrated leaves, and large yellow flower-heads, which are solitary at the end of the ramifications.

I'NULA HELENIUM (Elecampane), an indigenous perennial herbaceous plant, found in moist meadows, the root of which is used in medicine. This part is thick and branching, brown externally, white internally, with an aromatic odour and a mucilaginous taste, at first bitter, afterwards sharp and camphor-like. In addition to mucilage and a large quantity of a variety of starch termed *inulin*, it contains a crystallized volatile oil (stearopten), a bitter extractive, an acrid resin, and some salts of lime, &c.

These ingredients give it a tonic and stimulating property, and it is employed in debility of the stomach, and other diseases of mucous surfaces unattended with inflammation. It is however not much used.

INULIN, a peculiar vegetable substance which is spontaneously deposited from a decoction of the roots of the *Inula Helenium*. It is a white powder, like starch, is insoluble in cold and soluble in hot water, from which it is deposited on cooling, and this distinguishes it from starch. With iodine it gives a greenish-yellow compound, which is not permanent. Inulin is distinguished from gum by its insolubility in cold water, and by not giving saccholactic acid when digested in nitric acid.

INVARIABLE (Mathematics), the same word in meaning as CONSTANT, which see. There are however two sorts of constants, which it is desirable to treat under different names: the first, which we may call a constant, or a common constant, meaning a quantity which is absolutely invariable: the second meaning a function which may vary, but which does not vary in the processes required by a given equation. This we propose to call the invariable function of that equation, or its invariable.

Thus, in a common differential equation, which is supposed to be true of y and x when x passes through all stages of magnitude whatsoever, the only invariable is an absolute invariable, or a common constant. But in an equation of differences, in which x only passes from one whole number to another, the invariable function is any one which remains unaltered by changing x from one whole number to another. Thus, [INTEGRATION, FINITE] instead of saying that the solution of $\Delta y = x + 1$ is $\frac{1}{2}(x^2 + x) + C$, where C is a constant, we may allow C to be any function of x, which is unaltered by changing x from one whole number to another. Such a function is $\phi(\cos. 2\pi x)$, so that the solution is $\frac{1}{2}(x^2 + x) + \phi(\cos. 2\pi x)$, and the last term is the invariable of the equation.

Again, suppose it required to solve the functional equation $\phi(x^2) = 2\,\phi x$. One solution of this is $\phi x = c \log x$, where c is any absolute constant. But the equation is solved if c be a function of x, provided it be one which does not change when x is changed into x^2. Such a function is

$$\cos. \left\{ 2\pi \frac{\log. \log x}{\log 2} \right\} \text{ or any function of it,}$$

$$\text{or } \phi x = \text{any function of } \cos. \left\{ 2\pi \frac{\log. \log x}{\log 2} \right\} \times \log x.$$

General methods of finding invariable functions, as far as they have yet been given, will be found in the 'Encyclopædia Metropolitana,' article 'Calculus of Functions.'

INVENTION. This term, when used in the language of art, has a different signification from what it usually bears in common language. It does not mean *discovery*, but combines *conception*, or the peculiar way in which an artist's mind takes cognizance of a subject to be represented, with the *mode of treatment*, or choice of objects and manner of disposing them best adapted for producing a desired effect. Thus, in painting and sculpture, it is the faculty by which the most perfect mode of illustration, by colour or by form, is suggested to the artist, and by which the mind of the spectator is led to comprehend the truth, the intention, and the whole purpose of the work before him; but so distinct is it at the same time from perfect execution, that it is often found to exist independently of excellence in that particular, some of the finest inventions in art being manifestly defective in technical requirements. It is therefore the highest quality in the constitution of the artist's mind; as Opie says, 'Destitute of invention, a poet is but a plagiary, and a painter a copier of others.' (*Lectures on Painting.*)

It is hardly necessary to enter into the question whether the power of invention be a primary and original law of the mind, or whether the effect of cultivation. Some have believed it may be a result of acquirements begun in youth, and carried on till the power is developed and perfected; others conceive that it is unatatinable by any human effort, and is part of the original constitution of the mind.

But even admitting invention to be a gift of nature, and not reducible to rule, nor to be taught by any regular process, it still may be improved by study. Whatever natural disposition or original capacity may exist—and it will not, we suppose, be denied that some minds are more bountifully endowed than others—every power short of *creation* must have groundwork and foundation *on* which and *out of* which to exercise itself; and even the inventive faculty, which seems to approach nearest to creation, depends upon knowledge, by whatever means acquired, for materials with which to develop and declare itself. Sir Joshua Reynolds

(*Discourses*) says, 'He who has the most materials has the greatest means of invention, and if he has not the power of using them, it must be from a feebleness of intellect;' and 'it is in vain to endeavour to invent without materials on which the mind may work,' &c.

Raffaelle, by the wonderful ability and power which he has shown in choosing subjects in which the greatest quantity of matter or incident could be introduced, and then in representing them at the most critical moment for illustration, in combining all the most striking and affecting circumstances, and filling the spectator's mind with the whole story, by bringing before him, as it were, the past, the present, and even suggesting that which is to follow, may justly be considered the greatest master in invention. He was gifted, if any man ever was, with the fullest portion of natural and inherent genius, but he attained his eminence by the most persevering course of exercise and observation, as the necessary and only means through which the inventive faculty could be manifested. He studied nature diligently and profoundly in all her varieties of beauty and expression. Nothing seems to have escaped him; everything that offered itself out of her great storehouse was treasured as serviceable to his art, and he acquired such an accumulation of materials, serving as handmaids to his invention, that whatever subject came before him found him prepared, and was immediately dignified with all the expression, truth, propriety, and completeness, if we may use the word, that it was capable of receiving. Raffaelle never reached the perfect beauty and character almost superhuman which appear in the finest works of the Greeks, nor, in colour, the magic brilliancy and breadth of Titian, another master-spirit; yet, in the largest and most comprehensive sense of the quality we have been describing, he stands (perhaps with one mighty exception) without an equal or a rival.

The examples which may be most satisfactorily adduced in illustration of invention in the fine arts, both for their excellence and for the facility of reference, as we are so fortunate as to possess them in this country, are the Cartoons of Raffaelle preserved at Hampton Court. Of these the 'Paul preaching at Athens,' 'The Sacrifice at Lystra,' and 'The Death of Ananias,' may be selected as the most remarkable for the quality we have been considering.

Equally admirable, though totally in a different style, the frescoes of Michael Angelo, in the Sistine Chapel at Rome, must be quoted as triumphs of invention, a proud achievement of the human mind. The comprehensiveness of his scheme of illustration, with the greatness and energetic character of his design and composition, render this one of the finest monuments that art has to boast. In viewing the magnificent works of these two masters, namely, of M. A. Buonarotti, in this chapel, and of Raffaelle d'Urbino, in the loggie and stanze of the same palace (the Vatican), the spectator has a series of examples of as wonderful efforts of inventive genius in historical design as it seems possible to produce. The works of Rubens offer also fine examples of invention, though the quality of his design, or rather of his forms, was not according to a classical or pure standard.

It should be observed here that invention is quite independent of the *class* of design; its force and power may be displayed in every part of the art, and in subjects of inferior grade, or even in the mode of treating colour, light, and shade. Rembrandt, to proceed with further illustration, is one of those who displayed very high powers of invention; 'a genius,' Fuseli says, 'of the first class in whatever relates not to form;' and he justly eulogises his 'powers of nature' and 'the grandeur, pathos, and simplicity of his composition.' Thus also, though the quality of his art was not of the highest or grand class, the merit of invention is eminently due to our own Hogarth. Opie, in speaking of this artist, alludes in terms of high admiration to a fine example of invention in one of his pictures of the series called 'The Rake's Progress.' In the bagnio scene he has introduced in the back-ground one of the dissolute women of the party setting fire to a map of the World.

We have referred only to a very few out of the numerous artists whose works are worthy of attention as examples of invention; and have confined ourselves to some of the leading painters, though we might easily multiply them from productions in the sister art. Enough however has been said to point out the nature and value of that high quality in design, and to enable the intelligent observer to recognise and appreciate it when he meets it in the productions of artists, and discriminate between the efforts of elevated and original minds and the commonplace performances of mere mechanical copiers. Invention is required in every branch of art to raise it above tameness and insipidity: it is indeed the magic power by which works of art first attract and then fix the attention.

It is hardly necessary to observe, that, difficult as it may be to prescribe bounds to the imagination or the power of invention, it has in art certain and defined limits beyond which the painter and sculptor should not attempt to venture. When the artist dashes into extravagance, defies or outrages nature, and, with a view of exciting wonder, steps out of the region of what is, has been, or may be, he only shows that he has been gifted with fancy, but that it is wild and ill-regulated; he may awaken surprise, and may mistake it for admiration, but he will produce no lasting nor beneficial impression, and his undisciplined fantasy will never deserve to be ranked with the genius that has nobly illustrated nature by the only just, safe, and legitimate means, namely, her own beautiful, and expressive, and perfect works.

INVENTORY. [EXECUTOR.]

INVERARY, a royal burgh and seaport, capital of the county of Argyle, situated on a small bay at the head of Loch Fyne, where the river Aray falls into that arm of the sea, 75 miles west by north from Edinburgh. The town was erected into a royal burgh by charter granted by Charles I. and dated 28th January, 1648. (*Municipal Corporation Reports.*) The whole territory, with the exception of a small feu, is the property of the Duke of Argyle, of whom the inhabitants hold their houses and grounds either under leases or as tenants at will. It is governed by two baillies and nine common-councillors. The annual income of the burgh is about 180*l.* and the annual expenditure is somewhat less. The town consists chiefly of one row of houses facing the bay, built with great uniformity and covered with slate. The arrangements for watching, cleaning, lighting, and the supplying of water are confided to the town council, and the expenses are defrayed from the proceeds of the burgh manure. The inhabitants are principally engaged in the herring-fishery in Loch Fyne, which is said to have produced in some seasons upwards of 20,000 barrels. (*Beauties of Scotland*, vol. v., p. 437.) The grammar-school is superintended by a teacher, whose salary is 20*l.* The number of scholars during the last 10 years has varied from 25 to 30 annually. The population of the burgh and parish in 1831 was 1117.

Inverary Castle, the principal seat of the Duke of Argyle, is situated near the northern extremity of Loch Fyne. It is a quadrangular building, with a tower at each corner, and a high glazed pavilion rising from the centre of the roof. The stone of which it is constructed, though soft, is very durable, and becomes perfectly black when wetted by a shower. The spacious hall, which is hung with arms and other ornaments, is lighted by a lofty window, and surrounded by a gallery. The other apartments are fitted up in a modern style and with good taste. (*Parliamentary Papers; Beauties of Scotland*, &c.)

INVERNESS, a seaport town and royal burgh of some antiquity, the capital of the county of Inverness, and the principal town of the Highlands. It is situated at the southern extremity of the Moray Frith near the eastern entrance of the Caledonian Canal, 155 miles north by west from Edinburgh. The earliest charters upon record are those of King William the Lion, four in number, conferring several privileges upon the burgesses, which were confirmed and extended by the subsequent charters of Alexander II., III., Robert I., David II., James II., Queen Mary, and James VI. The last constitutes the governing charter of the town, and is dated [illegible] January, 1591. (*Municipal Corporation Reports.*) The management of the affairs of the burgh is vested in a provost, three baillies, and 15 town councillors. In 1832 the estimated value of the burgh property, consisting principally of lands and other heritable property, was 20,811*l.*, producing an annual revenue of 2236*l.* The annual expenditure at the same period was 2058*l.*, and at Michaelmas 1833 the aggregate debt was 10,614*l.* The town is large and well built; the houses are lofty, and many of them elegant. The streets have, since 1831, been paved with granite and hard sandstone brought from the banks of Loch Ness. Common sewers have been constructed, and the town is well lighted with gas, and supplied with water by means of pipes from the adjacent river. The system of police is also described

as most efficient. The public buildings consist of three national churches, an Episcopalian church, a court-house, and Tolbooth. The last is a handsome modern building with a fine tower terminated by a very elegant spire. The central school-house, situated upon the Green of Muirtown, is also a fine building, and comprises a large public hall, with six spacious apartments for the accommodation of the different classes and for the library and philosophical apparatus. Inverness is the centre of the custom-house district, which extends from the mouth of the Spey to Dornoch Frith on the east coast, and from Assynt Point to Ardnamurchan on the west. 'A striking alteration has of late taken place in the trade of grain; within fifteen years about 8000 to 10,000 bolls of oatmeal used to be imported annually into Inverness; while now from 4000 to 5000 bolls of oats are exported from its piers. . . . . The foreign annual imports into Inverness consist of from 400 to 600 tons of hemp, and three or four cargoes of timber or Archangel tar.' (*New Statistical Account of Scotland.*) There is no compulsory assessment for the support of the poor, who are provided for by special quarterly collections, by several charitable mortifications at the disposal of the magistrates, and from other sources. A short account of schools, which are numerous and upon the whole well conducted, is given in the article INVERNESS-SHIRE. The population of the burgh and parish of Inverness in 1831 was 14,324. The people in Inverness speak very good English: the tradition is that they learned it from Cromwell's soldiers. The climate of Inverness is much milder than might be supposed from its northern position in the island. Its mean annual temperature is about 47°, while that of the neighbourhood of London is about 48·5°, and that of London 50·5°. The mean annual quantity of rain which falls at Inverness is about 26·21 inches. This borough unites with Fortrose, Nairn, and Forres in returning one member to parliament.

INVERNESS-SHIRE, a maritime county of Scotland, bounded on the north by Ross-shire, on the south by the shires of Perth and Argyle, on the east by those of Nairn, Elgin, Banff, and Aberdeen, and on the west by the Atlantic Ocean; the mainland is comprised between 56° 40′ and 57° 36′ N. lat., and between 3° 50′ and 5° 50′ W. long. from Greenwich. Its greatest length from north-east to south-west is 88 miles, and its greatest width from north-west to south-east nearly 55 miles. According to Mr. M'Culloch (*Statistical Account of the British Empire*) the entire county contains 4245 square miles, or 2,716,800 acres, of which the mainland occupies 1,943,920, and its islands 773,760; the former having 84,480, and the latter 37,760 acres of water. It comprehends various districts, particularly that of Badenoch on the south-east, where it borders upon Perth and Aberdeenshire; Lochaber on the south adjoining Argyleshire; Glenelg on the north-west bordering upon the ocean; besides many inferior districts, such as Glengary, Glen Morrison, Glenshiel, &c. It also comprehends a considerable portion of the Hebrides, or Western Isles, including the Isles of Skye, Harris, Benbecula, North and South Uist, Barra, &c. [HEBRIDES.] This county, which is extremely mountainous, is intersected by innumerable lakes and rivers, and is divided into two nearly equal parts by the deep valley of Glenmore, which runs in a direction from Fort William on the south-west to the town of Inverness on the north-east. This county forms a large part of the Highlands of Scotland, and the general description of its geographical features cannot well be separated from that of the division of the island to which it belongs. [GREAT BRITAIN, p. 402.] By far the greater part of the surface is covered with heath, but a good deal of the heathy ground is arable, and a considerable extent of it has been brought into cultivation during the present century. The population in 1831, according to the population returns for that year, was 94,797, of which 44,510 were males, and 50,287 females. The valued rent at the same period was 73,188*l.* Scotch, but the annual value of real property in 1815 was 185,565*l.* The county sends one member to parliament. [INVERNESS.]

Geology and Mineralogy.—The prevailing rocks are of the primary class, having a highly crystalline structure, and being entirely destitute of organic remains. Gneiss is perhaps the most abundant, but huge masses of granite and of the oldest trap or porphyritic rocks are met with in the Grampians and the mountains of Glencoe and Ben Nevis. Limestone is found in several districts, and approaches to the nature of marble, particularly near Ballachulish and in the bed of the river three miles south of Fort William. Sandstone is also frequently met with. The beds of the stratified rocks are usually highly inclined to the horizon, approaching almost to the vertical, but the dip varies. Their general direction is from south-west to north-east. The two principal mountains are Ben Nevis and Mealfourvounie. The former, which is separated from the Grampians by the desolate tract called the Moor of Rannoch, is composed of porphyry and granite, and rises 4374 feet above the level of the sea, being the highest mountain in Great Britain. It is easily ascended on the western side; and at about the height of 1500 feet the prospect, till then confined, opens to the south-west and discovers the Paps of Jura and several of the Hebrides. Above the altitude of 2000 feet there is no vegetation, and on the north-east side of the mountain, near its summit, the snow lies throughout the year. Mealfourvounie, which rises 2730 feet above the sea-level, is composed of a conglomerate rock and stratified sandstone, the latter of which is of so hard a texture as to be used for the pavements of the streets of Inverness. Some veins of lead and silver have been discovered in several parts of the county, and also iron ore in small quantities, but we are not aware that mines have hitherto been worked to any extent. The soil is for the most part light and sandy, with a subsoil of gravel or clay; but in the neighbourhood of the town of Inverness it is enriched by a fine loam deposited by the waters of the adjoining frith.

Farms, Estates, and Agriculture.—In 1808 the landed property of this county was divided among 83 proprietors, viz. 7 estates of the valued rents of 3000*l.* per annum (Scotch); 6 from 1000*l.* to 3000*l.*; 23 from 400*l.* to 1000*l.*; 33 from 100*l.* to 400*l.*; and 14 under 100*l.* From that period to the present time we believe the above distribution has not undergone any material alteration. Formerly there were a great number of small arable farms only a few acres in extent, but these have much decreased since the introduction of sheep-farming. What remain of them are usually let from year to year, but the larger farms are let on lease, varying from seven to nineteen years. The farm-houses erected within the last forty years by the wealthier class of store farmers are for the most part well constructed, but the dwellings of the cottagers and poorer tenants are described as being in every respect comfortless and mean. (McCulloch's *British Empire*, vol. i., p. 310.) The attention of the farmers is chiefly directed to the rearing of sheep and cattle. The sheep are mostly of the Cheviot and Linton breeds, and the stock at the present time is estimated at 120,000; the stock of cattle is supposed to amount to 40,000 or 45,000, and is chiefly of the Skye or Kyloe breed. In the month of July a fair for the sale of sheep is held annually at the town of Inverness, where, upon an average, 100,000 sheep and as many stones of wool are bought up for the southern markets. The labourers and farm-servants generally live on potatoes with milk, and oats and barleymeal prepared in various ways, to which the wealthier tradesmen are able to add fish and butcher's meat. The usual rate of ploughmen's and farm-servants' wages is 8*l.* in money and six bolls of meal, with liberty to plant as much ground with potatoes as they can manure, and female labour is commonly reckoned at two-thirds that of men. The fields are frequently enclosed, and within the last twenty years a great deal of waste land has been drained and reclaimed, and much ground planted; but none of any consequence has been irrigated or embanked. The average rent of cultivated ground varies from 1*l.* to 2*l.* 10*s.* the acre, but in the immediate vicinity of the town of Inverness it is as high as 5*l.* to 7*l.* the acre.

Forests.—The fir woods in Glenmore and those of Strathspey in the adjoining county of Elgin are supposed to be more extensive than all the other natural woods in Scotland together. 'Glen Morrison, which opens into Glenmore, also contains much fine timber. In the parish of Kilmalie alone, near Fort William, it is estimated that there are about 14,000 acres covered with trees. Those which grow naturally are the oak, fir, birch, ash, mountain ash, holly, elm, hazel, and the Scotch poplar. Those which are planted are the larch, spruce, silver fir, beech, plane, and fruit trees. In these forests and the neighbouring mountains the herds of red and roe-deer roam in safety in recesses almost impenetrable to man. The alpine and common hare and other game are also abundant.

Manufactures.—Formerly a good deal of hemp, worsted,

and linen yarn was made in this county, but this has greatly declined since the establishment of the large manufactories of the south. At the present time there is a hemp manufactory employing nearly 300 hands, and a woollen factory for the weaving of coarse clothing and Highland plaids and tartan. The produce of the former is principally exported to the London market and to the East and West Indies.

Inland Navigation and Roads.—The Glenmore, or 'Great glen of Albion,' as it is sometimes called, which stretches across the county from Fort William to the town of Inverness, is partially covered by three lakes, Loch Lochy, Loch Oich, and Loch Ness, which lie nearly in a straight line between the above-mentioned limits. Their aggregate length is 37 miles 704 yards, and the entire distance between Fort William and Inverness is 59 miles and 1628 yards. In 1802 Mr. Telford was appointed by the commissioners of the treasury to make a survey of these lakes and of the adjoining country preparatory to the cutting of a canal. His report was made in the following year, and the works were in full operation in 1805, but the whole line of navigation was not opened till the latter end of the year 1822. The expense of constructing the Caledonian Canal, as it is called, was defrayed by government. That part of the navigation which is not upon the lakes is 22 miles and 1628 yards in length: it is 50 feet wide at the bottom and 15 feet deep, though the original plan contemplated a depth of 20 feet. Loch Oich is the summit-level of the canal, and its elevation is 94 feet above the level of the sea on the east coast, at high water and ordinary spring tides. The entire cost was 986,924*l.*, to which must be added a portion of the annual expenditure since the opening of the navigation, which has hitherto exceeded the produce of tonnage dues. The tonnage dues on vessels, whether laden or unladen, is one farthing per ton per mile, and produced in 1829 a revenue of 2575*l.*; but the expenditure during the same year amounted to 4573*l.*, so that this canal promises to be but an unprofitable speculation. 'Its chief effect, as regards the town of Inverness, has hitherto been the commencement and gradual formation of a direct intercourse with the great western marts of Glasgow and Liverpool, and, through them, with the manufacturing districts with which these cities are so closely connected.' (*New Statis. Acct.*) The roads are under the management of the Parliamentary Commissioners for Highland Roads —a body appointed for opening the communication by land about the same time that the Caledonian Canal was projected. They are said to be maintained in a state of most efficient repair, the expense being defrayed partly by government and partly by contributions from the county proprietors. The principal rivers are the Spey, Ness, and Beauly; in all of which there are valuable salmon fisheries, more particularly upon the Spey and Ness.

Education, Schools, &c.—Upon the formation, in the year 1818, of the 'Society for Educating the Poor in the Highlands,' a central or model school was erected on a large scale in the town of Inverness. This establishment, as might be expected, has already proved highly beneficial to the poor of the town and suburbs, and is upon an average attended by about 300 scholars. The same society supports twelve other similar institutions of less extent in the more remote and thinly peopled part of the Highlands, and from its first establishment in 1818 to the 30th of September, 1834, its total expenditure amounted to 8023*l.* The Raining School, founded in 1747 by Mr. John Raining of Norwich, and endowed by that gentleman with the sum of 1000*l.*, is superintended by two well qualified teachers, having salaries of 48*s.* and 40*l.* per year, together with a house and garden. The number of pupils is usually about 250. In addition to these, there are several private elementary schools, besides Sabbath evening-schools for religious instruction, which are attended by a very considerable number of children. 'Inverness, thus already more amply provided than many other towns with the means of education and improvement, has been further enriched by a munificent bequest of 10,000*l.* 3 per cent consols, left by the late Rev. Dr. Bell, the ingenious author of the Madras System of Education, and committed by him to the charge of the magistrates of Inverness, who contemplate, we understand, erecting another large charity-school, and relieving the Education Society of the burthen of supporting their central or model school on the Green of Muirtown.' (*New Statistical Account.*)

The parochial schools throughout the county are numerous and increasing, and the reader will find a very satisfactory description of their present state under the head of the several parishes in the above-cited work.

(*New Statistical Account of Scotland;* Playfair's *Description of Scotland; Beauties of Scotland;* Society's *Map of Scotland; Parliamentary Reports on the Caledonian Canal,* 1803-4-5-6; *Parliamentary Papers,* &c.)

INVERSE, INVERSION. Any two operations of algebra are said to be inverse when one of them undoes, so to speak, the effect of the other; so that if both be successively performed upon the same quantity, the result is that quantity itself. For instance, the operations implied in $1+x^2$ and $\surd(x-1)$ are inverse to one another; for

$$1+\{\surd(x-1\}^2=x, \qquad \sqrt{(1+x^2}-1)=x.$$

We need do no more than name addition and subtraction, multiplication and division, raising of powers and extraction of roots, as pairs of inverse operations.

The operation of inversion is the solution of an equation, and *vice versâ*. Let it be required to find the operation inverse to ϕx. Assume $\phi x=y$, and find x in terms of y; say $x=\psi y$, then $\phi(\psi y)=y$, or ϕ and ψ are inverse operations. Thus if $x^2-2x=y$, $x=1\pm\sqrt{y+1}$, and either of the two, $1+\sqrt{x+1}$, or $1-\sqrt{x+1}$, is inverse to x^2-2x.

It thus appears that a function may have more than one inverse function, and there are functions which have an infinite number; but there is a distinction by which one may be separated from all the rest. Let the Greek letters in this article be all functional symbols, or marks of operations to be performed, and let them come before the subject of operation, the quantity x, or y, &c., in the order in which they are to be performed. Thus $a\phi x$ denotes the result of performing the operation ϕ upon x, and then the operation a upon ϕx. Now let $\phi x=z$ give $x=\psi z$, where ϕx is an unambiguous operation, and ψz is, generally speaking, ambiguous, or presenting several different forms. Then ϕ and ψ are inverse operations, and $\phi\psi z=z$, and we might suppose at first that $x=\psi\phi x$; that is to say, we might imagine that ψ destroys ϕ as well as that ϕ destroys ψ. But since ψ is ambiguous, it may be that only one or more of the forms of ψ will satisfy $x=\psi\phi x$, and not all: and that this will be the case with one is obvious, while we can show that it cannot happen with more than one. For though the same operation, performed on different functions, may produce the same function, yet different operations, performed on the same function, must produce different functions. If then a and β be different forms of ψ, we have $\phi a x=x$ and $\phi\beta x=x$; but we cannot have both $a\phi x=x$ and $\beta\phi x=x$, where a and β are different, ϕx having absolutely the same form and value in both equations.

From all the inverses of a function ϕx, then, we separate that one, ax, which gives both $\phi a x=x$ and $a\phi x=x$, and call it the *convertible* inverse. Its symbol is ϕ^{-1}, so that $\phi^{-1}x$ means that operation which satisfies both the equations $\phi\phi^{-1}x=x$ and $\phi^{-1}\phi x=x$. [EXPONENT.] In the preceding example $1+\surd(x+1)$ is the convertible inverse of x^2-2x: for $1+\surd(x^2-2x+1)=1+x-1=x$. But $1-\sqrt{x^2-2x+1}$ gives $1-(x-1)$ or $2-x$; and we call this an inconvertible inverse.

Every function which has more than one inverse is not only a function of x, but the same function of other functions of x. Let $a\,x$ be an inconvertible inverse of x; then $a\phi x$ is not x, let it be ϖx. Then $\phi a x$ being x, $\phi a\phi x$ is ϕx, or $\phi\varpi x$ is ϕx, so that ϕx is the same function of ϖx which it is of x. Thus in the preceding example x^2-2x is the same function of $2-x$ which it is of x; or

$$x^2-2x=(2-x)^2-2(2-x).$$

We have then this theorem: every function has as many different forms as inverses, and all these forms can be made by writing different functions of x instead of x in the original function; and each inverse of the function is the convertible inverse to one of its forms, and an inconvertible inverse to all the rest. Thus $1-\surd(x+1)$, which is an inconvertible inverse to x^2-2x, is the convertible inverse of $(2-x)^2-2(2-x)$: for

$$1-\surd\Big((2-x)^2-2(2-x)+1\Big)=1-(2-x-1)=x.$$

The way to make the convertible inverse of a given func-

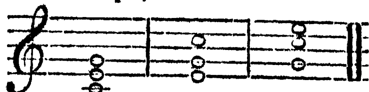
tion find all the rest is as follows. Find the solutions of the equation $\phi \varpi x = \phi x$, and let them be $\varpi_1 x, \varpi_2 x$, &c. Then $\phi^{-1} x$ being the convertible inverse of ϕx, the remaining inverses are $\varpi_1 \phi^{-1} x$, $\varpi_2 \phi^{-1} x$, &c. Thus in the preceding example $\phi^{-1} x$ being the convertible inverse, the other is $2 - \phi^{-1} x$. [PERIODIC FUNCTIONS.] There is a remarkable class of functions, each of which is its own inverse, such as $1-x$, $\frac{1}{x}$, $\surd(1-x^2)$, &c. Now if $\phi x = \phi^{-1} x$ we have $\phi \phi x = x$, and these functions will be considered, in the article just cited, as periodic functions of the second order.

The equation $\phi \phi^{-1} x = x$ being understood, suppose that between the first and second operations we interpose the operation a, so that we have $\phi a \phi^{-1} x$. This is no longer equal to x, but it is a function, the properties of which are closely connected with those of $a x$. For instance, if $a x$ and βx be inverse to each other, then $\phi a \phi^{-1} x$ and $\phi \beta \phi^{-1} x$ are also inverse to each other: for $a \beta x = x$ and $\phi a \phi^{-1}\left(\phi \beta \phi^{-1}\right) x$ is $\phi a \phi^{-1} \phi \beta \phi^{-} x$, or $\phi a \beta \phi^{-1} x$, or $\phi \phi^{-1} x$, or x. Thus knowing $x + 1$ and $x - 1$ to be inverse functions, we know immediately that $\log(\epsilon^x + 1)$ and $\log(\epsilon^x - 1)$ are inverse functions; and also $\surd(x^2 + 1)$ and $\surd(x^2 - 1)$. For more detail on this subject see the article 'Calculus of Functions,' in the 'Encyclopædia Metropolitana.'

INVERSION, in Music, is a change in the relative position of two sounds, or of the several notes of a chord. Thus C D, an interval of a 2nd, becomes by inversion (D C) a 7th. Example,—



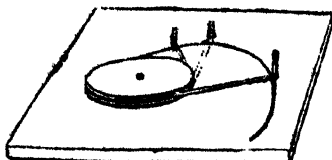
And C E G, the notes of the triad, or perfect chord, by inversion become the chord of the 6th (E G C), or of the 4th (G C E). Example,—



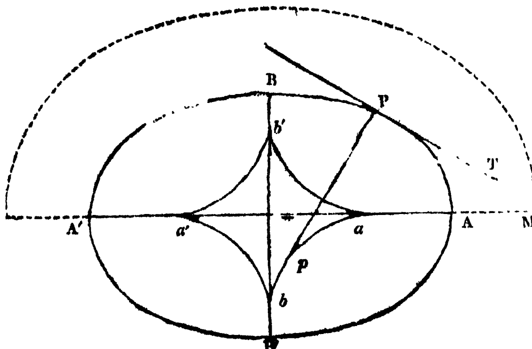
For other musical Inversions, see CANON and FUGUE.

INVOLU'CRUM, in botany, is any collection of bracts round a cluster of flowers. In umbelliferous plants it consists of separate narrow bracts placed in a single whorl; in many composite plants these organs are imbricated in several rows. If the bracts belong to a secondary series of the inflorescence, as in the partial umbels of an apiaceous plant, or in the solitary florets of Echinops, they form an involucel. The most singular state of the involucrum is that which is found in the genera Castanea, Fagus, Quercus, &c., where it forms a cup, or closed cover, remarkable in the European species of those genera, but much more so in the species of India.

INVOLUTE AND EVOLUTE (the curve unrolled and the curve from which it is unrolled), a name given to two curves so formed and placed, that supposing the second to be cut out from solid matter, the first can be formed by fastening one end of a thread upon a point in the second, attaching a pencil to the other end, and moving the pencil so that the thread may either gradually enwrap or be unwrapped from the curve to which it is fastened. Thus the pencil in the diagram is describing the involute of a circle, or the curve of which the circle is the evolute. But the evolute of a circle is evidently a point.

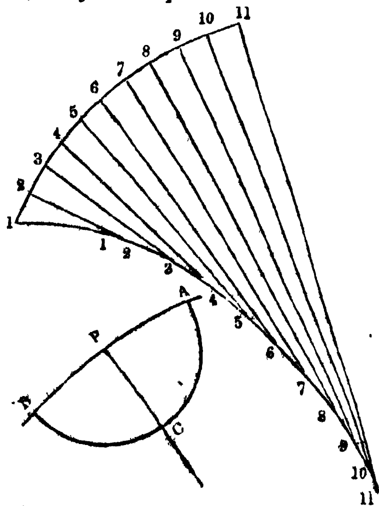


The following figure represents an ellipse with its evolute. If the thread be fastened at b, wrapped over $b a$, and continued to A, it will, as it unwraps from $a b$, describe the arc A B; and B A′ while it wraps over $b a'$. If fastened in a similar manner at b', it will by the same process describe A B′A′.



If the line p P be drawn tangent to the evolute at p, it is one of the positions of the thread, and P T, the tangent of the involute at P, is perpendicular to p P. Also p P is the radius of curvature of the involute at P; this is to say, no circle can pass so near the curve at P, as the one which has p for its centre and p P for its radius. [CURVATURE.] Also, any arc of the evolute is the difference of two radii of curvature of the involute: thus the arc $a p$ is the difference between a A and p P. Such are the principal geometrical connexions of the two curves.

Every curve has one evolute, and an infinite number of involutes. For instance, fastening the thread at b, and continuing it to M instead of A, we may with the cheeks $a b$ and $b a'$ produce another involute from them (represented by a dotted line); and any number, however great, by varying the position of M. But none of these involutes will be ellipses, except the one from which the evolute was made; though they will all be ovals having remarkable analogies with the ellipse. The proper name for curves described from the same evolute is *parallel curves*, since they have the fundamental property of parallel lines: for they never meet, though (if they admit of it) ever so far produced; a straight line perpendicular to one is always perpendicular to the other; and the part of the perpendicular intercepted is always of the same length. When arcs of parallel curves are required to be laid down, the most commodious method of proceeding is to construct the evolute of one of the arcs approximately, as follows. On the arc draw tangents at moderately small distances, and draw perpendiculars to those tangents. The parts of the tangents cut off from each by its neighbours will together give the arc of the evolute near enough for all purposes. And it may be well to notice that it will be a sufficiently accurate method of drawing the perpendicular to the tangent at a point P, if we take a small circle whose centre is P, bisect the arc A C B in C, and join and produce P C.



The angular error thus committed is only a small portion of the angle made by the tangents at P and A.

Whenever the two arcs adjacent to a normal (or perpendicular to the tangent) of the involute are equal and similar, there is a cusp in the evolute; and the evolute generally recedes without limit as we approach a point of contrary flexure in the involute.

The mathematical method of finding the evolute is as follows. Let $y=\phi x$ be the equation of the involute, and let X and Y be the co-ordinates of the point on the evolute corresponding to that on the involute whose co-ordinates are x and y. Form the three equations—

$$y=\phi x;$$
$$X-x+\frac{dy}{dx}(Y-y)=0;$$
$$1+\left(\frac{dy}{dx}\right)^2-\frac{d^2y}{dx^2}(Y-y)=0;$$

and from them eliminate x and y. The resulting equation between X and Y is that of the evolute. But if the evolute be given, and the involute is to be determined, let $Y=fX$ be the equation of the former, and from this and the latter two of the preceding three equations eliminate X and Y. There will result a differential equation of the second order between y and x, the primitive of which is the equation of the involute, the two arbitrary constants being determined by the point at which the thread is supposed to be fixed and the length of the thread.

Thus if the curve be a parabola having the equation $y=cx^2$, the equations for determining the evolute are—

$$y=cx^2;$$
$$X-x+2cx(Y-y)=0;$$
$$1+4c^2x^2-2c(Y-y)=0;$$

from which we find—

$$X=-4c^2x^3, \qquad Y=\frac{1}{2c}+3cx^2;$$

which give $Y=\frac{1}{2c}+\frac{3}{2}\left(\frac{X^2}{2c}\right)^{\frac{1}{3}}$,

the equation of the evolute of the parabola, which evolute therefore appears to be what is called a *semi-cubical* parabola.

For considerations similar to those which precede see CAUSTICS.

INVOLUTION and EVOLUTION. (Arithmetic.) Taking these words in their etymological sense, they might stand for the greater part of mathematical analysis. In their technical algebraical sense, they mean only the raising of powers, and the inverse operation, the extraction of roots. The revival however of a general process, accompanied by an improvement which makes it comparatively easy, renders it necessary to make a more extensive definition of the terms. We shall not relinquish any characteristic of the old meanings, and shall bring all corresponding processes together, by laying down the following definition:—Involution is the performance of any number of successive multiplications with the same multiplier, interrupted or not by additions or subtractions; and evolution is any method of finding out, from the result of an involution, what multiplier was employed, provided that the said method proceeds by involutions. Thus to determine $2x^3+4x^2-3x+10$ by involution, we multiply 2 by x, and add 4; then multiply by x and subtract 3, then multiply by x and add 10. If this give 1000, then any method of determining x which proceeds by successive involutions is evolution.

A few years ago our only instances of evolution would have been common division, and the extraction of the square and cube roots, with references to Vieta, Harriot, Oughtred, and the older algebraists in general, for evolutionary methods of solving equations, bearing a strong likeness to such extractions. But since the publication of Mr. Horner's 'New Method of solving Equations of all orders,' *Phil. Trans.*, 1819, the process which has rendered it worth while to propose the preceding extension of terms has been in the hands of mathematicians. For a more detailed account than we can here give, the reader is referred to the paper just cited, which is reprinted in the 'Ladies' Diary' for 1838, or to 'The Theory and Solution of Algebraical Equations,' by Professor Young of Belfast (London, J. Souter, 1835).

We should begin with simple division, and the extraction of the square and cube roots, if we were writing an elementary treatise. But taking it for granted that the reader is familiar with the first two, at least, we shall proceed to describe the general process. This consists of three distinct parts, the first two of which have been long known, while the third, which contains the peculiar distinction of this method, is due to Mr. Horner.*

1. In the article APPROXIMATION it is shown that if a be a value of x which makes ϕx very small, then $a-(\phi a \div \phi' a)$ is a value of x which makes ϕx much smaller; so that a continued succession of approximations may be made to a value of x which makes ϕx absolutely $=0$. Here ϕx means the differential coefficient or derived function and if

$$\phi x = Ax^n + Bx^{n-1} + Cx^{n-2} + \ldots\ldots \quad ; \text{ then}$$
$$\phi' x = nAx^{n-1} + (n-1)Bx^{n-2} + (n-2)Cx^{n-3} + \ldots.$$

2. Meaning by a root of ϕx, any value of x which makes $\phi x=0$, it is obvious that $\phi(x+a)$ is a function which has for its roots the roots of ϕx, each diminished by a. And the substitution of $x+a$ instead of x in the preceding value of ϕx gives a well known development, of which an instance will be more to our present purpose. Let the function be

$$Ax^5+Bx^4+Cx^3+Dx^2+Ex+F \ldots. \; (1).$$

Write $x+a$ for x, and this becomes

$$Ax^5+(5Aa+B)x^4+(10Aa^2+4Ba+C)x^3$$
$$+(10Aa^3+6Ba^2+3Ca+D)x^2$$
$$+(5Aa^4+4Ba^3+3Ca^2+2Da+E)x$$
$$+Aa^5+Ba^4+Ca^3+Da^2+Ea+F;$$

which we may represent by

$$Ax^5+\phi_4 a\, x^4+\phi_3 a\, x^3+\phi_2 a\, x^2+\phi' a\, x+\phi a.$$

3. The quantities ϕa, $\phi' a$, $\phi_2 a$, &c. may be determined by a succession of involutions, each one making use of the results of the preceding. Find ϕa by involution, of which the following are the steps:—

$$A$$
$$Aa+B$$
$$Aa^2+Ba+C$$
$$Aa^3+Ba^2+Ca+D$$
$$Aa^4+Ba^3+Ca^2+Da+E$$
$$Aa^5+Ba^4+Ca^3+Da^2+Ea+F=\phi a$$

Repeat the process, using the preceding quantities, except the last, and we have $\phi' a$ by the following steps:—

$$A$$
$$2Aa+B$$
$$3Aa^2+2Ba+C$$
$$4Aa^3+3Ba^2+2Ca+D$$
$$5Aa^4+4Ba^3+3Ca^2+2Da+E=\phi' a.$$

A repetition of the process, leaving out the last, gives $\phi_2 a$, as follows:—

$$A$$
$$3Aa+B$$
$$6Aa^2+3Ba+C$$
$$10Aa^3+6Ba^2+3Ca+D=\phi_2 a.$$

Repetition gives $\phi_3 a$, and finally $\phi_4 a$, as follows:—

$$A \qquad\qquad\qquad A$$
$$4Aa+B \qquad\qquad 5Aa+B=\phi_4 a$$
$$10Aa^2+4Ba+C=\phi_3 a$$

In numerical application the operations may be made to stand thus, where a new letter below a line stands for the sum of the two preceding; and ϕa, $\phi' a$, &c. are introduced when found.

A	B	C	D	E	F
	Aa	Pa	Qa	Ra	Sa
	P	Q	R	S	ϕa
	Aa	Ta	Ua	Va	
	T	U	V	$\phi' a$	
	Aa	Wa	Xa		
	W	X	$\phi_2 a$		
	Aa	Ya			
	Y	$\phi_3 a$			
	Aa				
A	$\phi_4 a$	$\phi_3 a$	$\phi_2 a$	$\phi' a$	ϕa

If a be of only one significant figure (as 200, 6, ·03), all the operations necessary to fill up this process can be performed in the head, and we have thus (for the method is general, though our example be only of the fifth degree) a working

* Mr. W. G. Horner was a schoolmaster and mathematical teacher residing at Bath, and died September 29, 1837. His works are announced as in preparation for the press, under the superintendence of Professor Davies, of the Royal Military Academy.

There has been some dispute about the right to the invention, of which we do not here speak in detail, as we have no doubt it will be extremely evident to all who examine the question that Mr. Horner is the first author and publisher (and, we believe, the only one) of that particular part of the method which goes beyond Vieta and his successors. (See 'Companion to the Almanac' for 1839.)

method of answering the following question:—Given a certain equation $\phi x = 0$; required the equation $\psi x = 0$, the roots of which are each less by a than those of $\phi x = 0$.

If ϕa came out $= 0$, we should then know that a is a root of the equation: and the method of approximating to a root is as follows:—Suppose we have an equation of which the root (unknown to us) is 26·73. By trial, or otherwise, suppose we find that 20 is the highest denomination of the root, and we thereupon find another equation, each of whose roots is less by 20 than a root of the given equation: this is done by the preceding process, and one of the new roots (but unknown) is 6·73. If we can find that the highest denomination of this root is 6, we make another reduction of all the roots, and find a new equation, one of whose roots is ·73. If we can then find ·7 to be the highest denomination, we repeat the process and find an equation one of whose roots is ·03. In finding the highest denomination of this root we find the root itself, evidenced by the ϕa of this final process being $= 0$.

The first denomination of the root must be found by trial, or by some of the methods referred to in THEORY OF EQUATIONS. But the second and the remaining ones are found by comparing the results ϕa and $\phi' a$. If a be nearly a root,

$$a - \frac{\phi a}{\phi' a} \text{ or } a + \frac{-\phi a}{\phi' a}$$

is still nearer. Consequently, by dividing $-\phi a$ by $\phi' a$, we may, after the second process, be sure of finding one figure of the remaining root correct. But after the first process we may be liable to an error of a unit (to be corrected by a new trial), as in extraction of the square root.

In order to obtain $-\phi a$ and not ϕa, let the last coefficient, F, have its sign changed, and let the process in the column which contains it always be subtraction, and not addition. In the preceding type of calculation, we should then have

$$\begin{array}{c} -\mathrm{F} \\ \underline{\mathrm{S}a} \\ \text{Subtr.}\ -\phi a \end{array} \quad \text{instead of} \quad \begin{array}{c} \mathrm{F} \\ \underline{\cdot \mathrm{S}a} \\ \phi a\ \text{Add.} \end{array}$$

In carrying on the process, the results ϕa, $\phi' a$, &c. come in a diagonal line; before taking the next step, the beginner should bring them down into one line, as in the type preceding. In our examples, asterisks or other symbols will mark results of a process.

We now apply this method to the solution of the equ a tion—

$$x^4 + 2x^3 - x^2 - x - 631064798 = 0.$$

It will be found that a root lies between 100 and 200.

1	2	−1	−1	631064798(158
...	100	10200	1019900	101989900
	102	10199	1019899	529074898:
	100	20200	3039900	410987450
	202	30399	4059799:	118087448;
	100	30200	4159950	118087448
	302	60599:	8219749	0
	100	22600	5414950	
	402:	83199	13634699;	
...	50	25100	1126232	
	452	108299	14760931	
	50	27600		
	502	135899;		
	50	4880		
	552	140779		
	50			
	602;			
...	8			
	610			

Assuming 100 as a first approximation, we find that $x^4 + 402x^3 + 60599x^2 + 4059799x - 529074898 = 0$ is an equation having roots less by 100 than those of the given equation. And 529074898 contains 4059799 upwards of 130 times; but if any number of tens greater than 50 be taken, the accumulations of the next involution will give more than 5290, &c., as must be found by trial. Repeating the process, we find that $x^4 + 602x^3 + 135899x^2 + 13634699x - 118087448 = 0$ is an equation all whose roots are less by 50 than those of the last. We can now depend upon 118087448 divided by 13634699 giving one figure of the root, and the quotient is between 8 and 9. Assuming 8, the first step of the third process shows that 8 is a root of the last equation, and 58 of the preceding, and 158 of the given equation.

We now give an example in which approximation is carried on. Let the equation be $x^3 - 6x^2 + 7x + 4 = 0$, of which one root lies between 2 and 3. The first working column is abbreviated.

1	−6	7	−4(2·414213562
2	2	−8	−2
	−4	−1	−2:
	2	−4	−1·936
	−2	−5:	−0·064;
	2	0·16	−0·045079
	0:	−4·84	−0·018921†
·4	0·4	0·32	−0·017963056
	0·8	−4·52;	−0·000957944‡
	1·2;	0·0121	−0·000897113
·01	1·21	−4·5079	−0·000060831‖
	1·22	0·0122	44853
	1·23†	−4·4957†	15978
·004	1·234	0·004936	13456
	1·238	−4·490764	2522
	1·242‡	0·004952	2243
·0002	1·2422	−4·485812‡	279
	1·2424	0·000248	269
	1·2426‖	−4·485564	10
		0·000248	8
		−4·485316‖	2

The root of this equation is found to be 2·414213562, as follows. Beginning with the multiplier 2, one set of involutions brings us to the figures followed by colons, and $x^3 + 0x^2 - 5x + 2 = 0$ is an equation on which the process is to be repeated. Dividing -2 by -5 we find that ·4 is most probably the next figure, which is verified in the next trial, since the result of involution, 1·936, is less than 2. We proceed in this way until 2·4142, containing half the number of figures wanted, is found, and this being a, we have found $-0·000060831$ for $-\phi a$, and $-4·485316$ for $\phi' a$. The first divided by the second may be depended upon for doubling the number of figures, as commonly practised in the extraction of the square root. [APPROXIMATION.] The figures 13562 are found by a contracted division shown in the example.

But it is more convenient to avoid decimals in the process, which may be done as follows 1. If there be decimals in the coefficients of the equation, annex ciphers to every place in such manner that the number of decimals in the several places may be in increasing arithmetical progression. Then strike out the decimal points entirely, and proceed as with whole numbers, remembering that the root thus obtained will be 10 times too great if the progression increase by units, 100 times too great if it increase by twos, and so on. Thus $1·81x^3 - ·6x^2 + 33x + 18·4$ should be changed into $1·81x^3 - ·600x^2 + 33·0000x + 18·40000$, and $181x^3 - 600x^2 + 330000x + 1840000$ will give ten times the required root. 2. When all the whole figures of the root have been obtained, and the decimal part is about to enter the calculation, before attempting to obtain the first decimal figure annex a cipher to the first working column on the left, two ciphers to the second, and so on to the end. Then proceed with the new figure as if it were a whole number, and make a new involution. When this is finished annex ciphers again as before. One additional advantage will be that the ciphers will serve to mark the places of completion of the individual involutions. If in any case ϕa should not contain $\phi' a$, place a cipher in the root, annex ciphers again, and then proceed. In some of the older algebraists, Oughtred for instance, the several vertical lines of figures are kept in their places by a set of ruled columns, the use of which is difficult. Mr. Horner has a similar contrivance; but the employment of ciphers removes all the difficulty, as in common division and the extraction of the square root. See the last example in this article. The method might easily be extended to the whole part of the root.

The following is an instance of the method:—

$$x^4 + x^3 - x^2 - 2x - 2 = 0.$$

```
1  1      −1         −2              2(1·414,2136
2  2       2          1            −1
3  3       1         −1             30000
4  4       3          4             28256
50 5       4         3000           17440000
54 ...     4         4064           12206261
58         800       7064           52337390000
62         216       4992           49671698816
660        1016      12056000       2665691184
661        232         150261       2495754355
662        1248      12206261       169936829
663        248         150923       124787718
6610       149600    12357184000    45149111
6644         661       60740704     37436315
6648       150261    12417924704    7712796
6652         662       60847072     7487263
6656       150923    12478771776
             663
           15158600
             26576
           15185176
             26592
           15211768
             26608
           15238376
```

Many of the preceding figures are useless, but we have judged it best to present the whole process. The best method of abbreviation is to fix a point of the process from and after which the number of figures in the last column is not to increase, striking off at every step one figure from the last column but one, two from the last but two, and so on. The consequence will be that the several columns on the right will disappear one after the other; the process will be legitimately reduced to termination with a contracted division, independently of the theorem cited; and the result will be true to the last place. The effect of this will be, that as soon as the remaining part of the root is too small for its highest power to show itself in the process, an equation of the $(n-1)$th degree takes the place of the nth, and so on, until there remains only an equation of the first degree, and the approximation then proceeds by the Newtonian method. All this was pointed out by Mr. Horner, whose view of his own method was very complete, in everything but historical information. Had he given in his paper an example from Oughtred, also worked by his own method, pointing out the difference of the two, we feel sure that the question about the right to the invention never would have been discussed.

Taking up the preceding example at the point with which we left off (neglecting the division), and following the process, we have

(Root obtained 1·414) 213562373

```
6 | 656       15  23  83 | 76     124787  7  1  7  7 | 6        2665691184
Disappears              13           30  4  7  9  4           219636394
 at           15  23  97         124818  1  9  7  2            169327240
 next                 13             30  4  8  2  0            124850203
 step         15  24  10         124848  6  7  9 | 2            44477037
                      13              1  5  2  4                37455657
              15  24 | 23        124850  2  0  3                 7021380
                                      1  5  2  4                 6242610
              15 | 24            124851  7  2 | 7      Dividend   778740
                                         4  6                     749117
                                 124852  1 | 9                     29623
                                         4  6                      24970
              15 |               124852  6 | 5                      4653
                                         1                          3746
 Disappears, leaving             124852  8                           907
   1 for carriage.                       1                           871
                       Divisor   124852 | 9                           33
                                                                      37
```

The answer 1·414213562373 is correct to the last place inclusive. (The contracted division follows the thick line.) The rule by which to judge of the extent to which the full process should be continued is as follows: Carry it on until the last column but one has at least two more figures than the number of root figures *remaining* to be found.

Such is the method which must place its author among those valuable inventors who find out simple adaptations which have been overlooked by their predecessors. It is not a little remarkable that this, the most important facilitation which the solution of numerical equations has received since the time of Vieta, and which is, *when known*, a very obvious extension of the extraction of roots, should have only preceded by a few years the most important addition to the method of ascertaining the number of roots which has been made since Des Cartes, and which is also, when known, an equally simple result of the process of finding the highest common factor of two algebraical expressions. [STURM'S THEOREM.]

Two of the most remarkable applications of this method are, the solution of equations of the second degree, which is made as simple as the extraction of the square root, and the extraction of the cube root, which is reduced from an impracticably complicated process to one of perfectly easy performance.

As an example of the first, required the solution of

$$2x^2 + x = 2.$$

Since the root is less than unity, the preparation for decimals is made at the outset.

```
2   10       200(·78077643
    14       168
    24        3200
    14        3168
    380        320000
    16         288498
    396         31502
    16          28854
    41200        2648
    14           2473
    41214         175
    1             165
    4122           10
                   12
```

or $x = ·78077643$, which is correct with the exception of the last place. The extraction of the square root, say of 10, is done by solving the equation $x^2 + 0x = 10$; but it will be found that the solution of any equation of the form $x^2 + ax = b$ may be performed by the same rule as the extraction of the square root. We shall show this, beginning with Horner's rule, and changing to the other after a few steps. Let the equation be $x^2 + 2x = 10$.

```
1  2       10(2·31662479
   4        8
   60     · 200
   63       189
   660      1100
   661       661
   662  6626 )43900
               39756
        66326 )414400
               397956
         66332 )16444
                13266
                 3178
                 2653
                  525
                  464
                   61
                   59
                    2
```

In the extraction of roots the method of pointing and bringing down the periods as they are wanted may be followed. The following is the process for the extraction of the cube root of 205692449327; it being remembered that the question is the solution of an equation of the form $x^3 + 0x^2 + 0x = a$.

```
1  0        0              ·  ·  ·  ·
   5        25          205692449327(5903
   10       7500        125
   150      1431         80692
   159      8931         80379
   168      1512           313449327
   17700    104430000      313449327
   17703        53109              0
            104483109
```

The opposite process is the extraction of the cube root of 1·808, and will serve as an example of the complete process, omitting only the first column, which, with the exception of the unit at the head, is blank. And this is also the type of the solution of any cubic equation whatsoever; the only difference being that the heads of the first and second working columns are ciphers in the extraction of the simple root, and significant in all other cases.

```
  00          000             1808(12·182398697839570002
a 10          100 a                ad·gjmpsvwxyz abcdefg
b 20          100 aa          1000 aaa
c 30          200 b            808
d 32          300 b            728 ddd
e 34           64 d             80000
f 360         364 dd            43561 ggg
g 361          68 e             36439000
h 362         43200 e           35371232 jjj
i 3630          361 g            1067768000
j 3638        43561 gg            890260568 mmm
k 3646          362 h             177507432000
l 36540       4392300 h           133564300767 ppp
m 36542         29104 j            43943131233000
n 36544       4421404 jj           40070573018919 sss
o 365460        29168 k             3872558214081
p 365463      445057200 k           3561857365704 vvv
q 365466          73084 m            310700848377
r 3654690     445130284 mm           267139491006 www
s 3654699         73088 n             43561357371
t 3654708     44520337200 n           40070925909 xxx
u 3654717         1096389 p            3490431462
  x w v       44521433589 pp           3116627593 yyy
                  1096398 q             373803869
              4452252998700 q           356186010 zzz
                   32892291 s            17617859
              4452285890991 ss           13356975 aaa
                   32892372 t             4260884
              4452318783363 t             4007093 bbb
                     292377 v              253791
              445232170713 vv              222616 ccc
                     292377 v               31175
              445232463090 v                31166 ddd
                       2192 w                   9
              44523248501 ww                    9 ggg
                       2192 w                   0
              44523250693 w
                         32 x
              4452325101 xx
                         32 x
              4452325133
              gfedcbazy
```

The preparation for decimals makes the answer ten times too great; so that the cube root of 1·808 is 1·218...002, of which only the last figure 2 cannot be depended upon. The preceding contains every figure which need be written down, all the connecting operations being those which are usually performed mentally, and one only is required for each figure. We do not think that any attempt to shorten the work, by leaving out the recurring figures, or employing double mental operations, would save time; and it would certainly very much augment the liability to error. The vertical lines in the example show that part of the operation in which the contraction takes place, and the point at which the contraction becomes simple contracted division is marked by a thick horizontal line. To enable the beginner to examine the process we have placed a letter in every line of the first working column, by which the parts of the second column which are connected with it may be traced; while a letter doubled in the second column shows a multiplicand, the product of which by the root figure is found as marked in the third column. The letters under the last line of the first column mark the figures cut off in the several contractions, and their results in the other columns are traced in the same way: the same for the letters under the second column.

One simplification might be made after the learner has practised a number of examples conducted as above. In the second working column certain lines, namely, the second *b*, the second *e*, the second *h*, &c., are not used except to be added to the next line. Hence each of the lines on which a letter is doubled might be formed by adding the first, third, and fourth preceding lines, and the effect would be to omit some of the lines and some of the most simple additions. The second column, beginning from *pp* inclusive, as a specimen, and changing the line in which ciphers are annexed (and the ciphers should always be annexed to mark the step) would be

```
44521433589   pp
  109639800   q
   32892291   s
4452285890991 ss
   32892372   t
     292377   v
445232170713  vv
     292377   v
       2192   w
44523248501   ww
```

But considering that the process is one which no person will very often perform, we doubt whether to recommend even this abridgment. All such simplifications tend to make the computer lose sight of the uniformity of method which runs through the whole; and we have always found them, in rules which only occur now and then, afford greater assistance in forgetting the method than in abbreviating it.

On evolution of algebraical quantities we do not think it necessary to speak, since either the binomial theorem [BINOMIAL THEOREM], or some other method of development, is employed with more advantage than the usual modification of the arithmetical process. We have also omitted the process of division, the most simple of all evolutions, since its connection with the preceding is sufficiently obvious.

There is however a process of an evolutionary character which we take this opportunity of suggesting, and of which any one moderately conversant with algebra will easily arrive at the demonstration. In finding the highest common divisor of two algebraical integral expressions, and also in the process of Sturm's Theorem, it is required to divide one ex-

pression, P, by another, Q, not for the sake of finding the quotient, but the remainder; and this remainder, cleared of all numerical factors and of fractions, is preferable. The following rule will render the application of Sturm's Theorem much more easy.

Question:—Two expressions, P and Q, being given, of which P is lower than Q, required the remainder of Q divided by P, cleared of fractions and of positive numerical factors. To take an example with us, let

$$P = 2x^3 - x - 4$$
$$Q = 4x^5 - 3x^4 + 2x^2 - x + 1.$$

1. Add 1 to the difference of the degrees $(5 - 3 = 2,\ 2 + 1 = 3)$: this is the number of operations to be expected. In this case it is three.

2. Write down in two lines the coefficients of the divisor and dividend, including the coefficient 0 for every missing term, but change the sign of every coefficient in the divisor, *except the first*. Clear both expressions of all whole factors; and if the two leading coefficients (2 and 4) have a common factor, divide by this factor before writing them down. Write ciphers in all blank places.

(P)	1	0	1	4	0	0
(Q)	2	−3	0	2	−1	1

2. Take the first vertical pair, and every other in succession, and make cross multiplication and addition: thus $\begin{matrix} a & . & . & c \\ b & . & . & d \end{matrix}$ gives $ad + bc$. Put the first result in the first column, the second in the second, and so on.

(1) −3 2 10 −1 1

3. Repeat this process with the first line, and the result just obtained, and again with the result, making each new result out of the first line and the last result, and so on till the number of operations ascertained in the first clause of the rule has been performed. But if the leading term of the first line have been divided, multiply it again after the result, unless the first term of the result be also divisible by the same factor.

4. But if ever the first column of a result should turn out a cipher, throw it away, and bring forward the next column, and so on: making every step stand in the next higher place: and if the two first columns of any result should be ciphers, throw them away, and bring forward the third, and so on. And for every cipher thus thrown away diminish by one the number of operations required in the first clause.

5. If any horizontal line thus obtained have a factor in all its terms, divide by that factor before proceeding further: and if the leading term of any new result have a factor in common with the leading term of the first line, divide both before proceeding.

The table of results now is as follows, in which the various changes of the leading terms are shown by putting them down as they occur, and putting a bar over them as they disappear and are replaced by others. In practice the pen may be drawn through the figure which is dismissed.

(P)	$\bar{2}$, $\bar{1}$, $\bar{2}$, 1	0	1	4	0	0
(Q)	$\bar{4}$, 2	−3	0	2	−1	1
(1)	−$\bar{3}$	2	10	−1	1	
(2)	$\bar{4}$, 2	17	−14	2		
(3)	17	−12	10			

$17x^2 - 12x + 10$ Answer

6. When the last result has been obtained make an algebraical expression one degree lower than the divisor, the coefficients of which are the numbers in the last result, with their signs.

The real remainder in the preceding example is $8\frac{1}{2}x^2 - 6x + 5$.

Let the next example be

$$P = 4x^3 - 6x^2 + x + 1$$
$$Q = 2x^6 - 3x^5 + 2x^4 + x^3 - 3x^2 - 3x + 4.$$

Here the number of operations should be four; but it is reduced by the circumstance mentioned in the fourth clause of the rule.

(P)	$\bar{4}$, $\bar{2}$, $\bar{4}$, 2	6	−1	−1	0	0	0
(Q)	$\bar{2}$, 1	−3	2	1	−3	−3	4
(1)	$\bar{0}$,* 3	1	−6	−6	8		
(2)	$\overline{22}$, 11	−27	−27	32			
(3)	12	−65	53				

$12x^2 - 65x + 53$ Answer.

* Then bring forward the next column.

The method of proof of the several processes, as their results arise, is as follows: Make an additional proof column, in which place the sums of the numbers in each line, taken with their signs; making these sums vary with the variation of the leading factors: thus

			Proof.
a	b	c	A
p	q	r	P
$aq + bp$	$ar + cp$	. . . . . .	Z

Here A is $a + b + c + \ldots$; B is $p + q + r + \ldots$; and Z is $aq + bp + ar + cp + \ldots$. If then the process be correctly done, an extension of it to the proof column gives aP + Ap, which ought to exceed Z by $2\,ap$.

We shall conclude this article with the process which will be applied hereafter. [STURM'S THEOREM.] The object is to proceed as in finding the greatest common divisor of P and Q, changing the sign of every remainder before using it.

$$P = 4x^3 - 9x^2 - 4x + 1$$
$$Q = x^4 - 3x^3 - 2x^2 + x - 3.$$

					Proof column.
4	9	4	−1	0	16
1	−3	−2	1	−3	−6
−3	−4	3	−12		−16
−43	0	−45			−88
43	0	−45	0		−2
4	−9	−4	1		−8
−387	−352	43			−696
−15136	19264				4128
15136	19264				34400
43	0	45			

The remainders therefore, with the signs changed as directed, are $43x^2 + 45$, $15136x - 19264$, and the last is a negative whole number. The following is the first instance of the use of the proof column:—

$$1 \times 16 + 4 \times (-6) - (-16) = 8 = 2(4 \times 1)$$

IODINE, a non-metallic elementary or simple solid body, which was discovered by M. Courtois, of Paris, in 1812. Its peculiar properties were however first ascertained by Gay-Lussac and Davy. Iodine exists in the water of the ocean and mineral springs, probably combined with sodium, in marine molluscous animals and sea-weeds; it has also been met with in combination with silver. Iodine is principally obtained from *kelp*, or sea-weed which has been burnt for the purpose of obtaining alkali from it. When the alkaline and other salts have been separated, the residual solution is treated with sulphuric acid and binoxide of manganese, by which the iodine is set free, the decomposition being analogous to that by which chlorine is obtained by the same agency from common salt.

Iodine is a soft opaque solid, of a bluish-black colour and metallic lustre. The primary form of the crystal is a right rhombic prism, and the crystals are usually flat. According to Gay-Lussac, its specific gravity is 4·948. When moderately heated, it rises in vapour of a violet colour, and hence its name from the Greek. On cooling, it again crystallizes unchanged, nor is it decomposed or altered by being subjected to very high temperatures, and it has resisted all attempts to decompose it. Iodine has a strong disagreeable odour and taste resembling those of bromine and chlorine; it stains the skin of a brownish colour, but not permanently. It is readily dissolved by alcohol; the solution is of a reddish-brown colour, but so little is taken up by water that a pound of water will not dissolve more than a grain of it. It is very poisonous. Its characteristic property is that of giving an intense blue colour when added to a solution of starch. It unites with metals to form compounds, which are termed *iodides*, and, like chorine and bromine, it forms acids both with hydrogen and oxygen.

Oxygen and Iodine combine to form probably four compounds; the first is *oxide of iodine*. When the vapour of iodine and oxygen gas are mixed at rather a high temperature, the violet tint of the iodine disappears, and a yellow soft substance is formed, which is regarded by Sementini as oxide of iodine; if this be subjected to the action of more oxygen gas, it is converted into a yellow liquid, which the same chemist supposes to be iodous acid; but the composition and properties of these compounds have not been accurately determined.

Iodic Acid.—This compound was first obtained by Davy by the action of iodine upon what he called euchlorine gas. A better process has however been proposed by Mr. Connell, which consists in heating the iodine in the strongest nitric acid. For this purpose the acid should be introduced with about a fifth of its weight of iodine into a tube about an inch wide and 15 inches long, and sealed at one end, and these materials are to be kept boiling for 12 hours; the iodine which rises and condenses on the sides of the tube is to be returned to the acid either by a glass tube or by agitation; when the iodine disappears, the excess of nitric acid is to be got rid of by evaporation. Iodic acid is a white semitransparent solid substance, which is inodorous, but has an astringent sour taste. It is so dense as to sink in sulphuric acid, and it deliquesces in a moist atmosphere. It is very soluble in water; the solution reddens vegetable blue colours; it detonates when mixed and heated with charcoal, sugar, and sulphur. It combines with metallic oxides to form salts, which are termed *iodates*, and these, like the chlorates, yield oxygen when heated; and an iodide remains.

Iodic acid is composed of

Five equivalents of oxygen 8 × 5 =	40
One equivalent of iodine	126
Equivalent	166

Oxiodic or Periodic Acid.—When chlorine is added to saturation to a solution of iodate of soda with excess of the alkali and concentrated by evaporation, a sparingly soluble white salt is obtained, which is *oxiodate of soda*: when this is dissolved in dilute nitric acid and mixed with nitrate of silver, a yellow precipitate falls, which, dissolved in hot nitric acid and evaporated, yields orange-coloured crystals of oxiodate of silver; these are decomposed by cold water, and an aqueous solution of pure oxiodic acid is formed; this by cautious evaporation yields hydrated crystals, and these, when heated to 212°, are resolved into oxygen and iodic acid. It consists of

Seven equivalents of oxygen 8 × 7 =	56
One equivalent of iodine	126
Equivalent	182

Azote and Iodine form iodide of azote. This compound cannot be obtained by direct action, on account of the weakness of the affinity existing between its elements. It is prepared by putting iodine into an aqueous solution of ammonia, which being decomposed, its hydrogen forms hydriodic acid with one portion of the iodine, whilst the azote combining with another portion of it, the result is iodide, or, correctly speaking, teriodide of azote, which remains insoluble in the state of a dark brown powder. This compound is very explosive, especially when dry: the best method of exhibiting its power is that of allowing it to dry in small portions on bibulous paper, and then simply letting it fall on the ground or merely touching it, it detonates with a sharp noise, heat and light being emitted, and the vapour of iodine and azotic gas are evolved. It is not dangerously explosive. It i composed of

One equivalent of azote . .	14
Three equivalents of iodine 126 × 3 =	378
Equivalent	392

Hydrogen and Iodine form hydriodic acid, which may be prepared by the direct combination of its elements. When a mixture of iodine in vapour and hydrogen gas is passed through a red-hot porcelain tube, they combine to form this acid. It is however much more conveniently formed by heating in a retort one part of phosphorus and about 12 parts of iodine moistened with water; by the mutual action of these substances the water is decomposed, its oxygen combines with the phosphorus, forming phosphoric acid, while the hydrogen unites with the iodine to form hydriodic acid, which passes over in the state of a colourless gas. This acid has a sour taste, reddens vegetable blues, and when mixed with atmospheric air forms dense white fumes with its moisture: its odour resembles that of hydrochloric acid gas. It is soluble in water. The salts which it forms are termed hydriodates: but when it is acted upon by metals, hydrogen is evolved, and when by metallic oxides, water is formed, and in both cases iodides are the result.

It is decomposed by oxygen when they are heated together; water is formed, and iodine evolved. It is also immediately decomposed by chlorine, which unites with its hydrogen to form hydrochloric acid, and iodine is set free. It is composed of

One equivalent of hydrogen	1
One equivalent of iodine	126
Equivalent	127

One volume of it consists of half a volume of hydrogen gas and half a volume of the vapour of iodine.

Chlorine and Iodine appear to form three chlorides. The protochloride may be obtained by passing a current of chlorine gas into water in which chlorine is suspended; a deep reddish solution is formed, which yields irritating fumes possessing the smell of both the elements; it first reddens and then bleaches litmus paper. The terchloride may be formed by repeatedly distilling the protochloride. The perchloride when decomposed by water gives rise to hydrochloric and iodic acids. The opinions of chemists with respect to these compounds are yet somewhat at variance.

Sulphur and Iodine is formed by heating gently a mixture of 1 part of sulphur and 4 parts of iodine. The product is of a dark colour, and has a radiated structure; it is easily decomposed by heat.

Iodine and Phosphorus combine readily without the application of heat; and so much heat is evolved by their action that the phosphorus takes fire if the experiment be made in the open air; but in close vessels no light appears. The composition of iodides of phosphorus is rather uncertain; that which is probably a protiodide is formed with one part of phosphorus and seven or eight parts of iodine; it has an orange colour, fuses at 212°, and when heated sublimes without changing; it is decomposed by and decomposes water, forming with its elements hydriodic and phosphorous acids, while phosphorus is set free. It is probably composed of

One equivalent of iodine	126
One equivalent of phosphorus	16
Equivalent	142

The sesquiodide is formed by the action of 1 part of phosphorus and 12 parts of iodine. It is a dark grey crystalline mass, which fuses at 84°, and with water yields hydriodic and phosphorous acids. It is composed of

One and a half equivalent of iodine	189
One equivalent of phosphorus	16
Equivalent	205

The periodide is prepared with 1 part of phosphorus and 20 of iodine; it is a black compound, fusible at 114°. By the action of water it yields hydriodic and phosphoric acids, and hence it is inferred to consist of

Two and a half equivalents of iodine	315
One equivalent of phosphorus	16
Equivalent	331

Iodine and Carbon unite to form two compounds, but not by direct action. They are not important, and their composition has not been ascertained.

The compounds of iodine and metals are mentioned under each metal.

IODINE, *Medicinal Properties of.* Iodine, though only obtained in an isolated state of late years, has been long employed as the efficient principle of other preparations and therapeutic agents, namely, burnt sponge and certain mineral waters. It is only since it has been procured as a distinct principle that its action has been ascertained with precision. In the present day it is administered rather in some artificial compound than as pure iodine, owing to its very sparing solubility in water. Iodine in substance, however, when applied to the skin, stains it brown, and even the very small quantity which can be dissolved in water is sufficient to cause rubefaction, and in the form of baths produces decided action both on the surface of the body and the general system. When applied to ulcers or any breach of the skin, it occasions heat and a sense of pricking and tingling; it is also absorbed, and may be discovered in the blood and the secretions of the patient. Taken internally, even in small doses, it causes a sense of heat in the mouth and throat; if much diluted by the vehicle in which it is given, and the stomach be healthy, it appears to do little more than increase the digestive powers; but in larger and stronger doses it creates great heat in the region of the stomach, which becomes sensible to pressure, with a feeling of

weight, heartburn, and often nausea and vomiting. In very large doses it acts as an irritant poison. It is not merely an irritant poison when taken in a large dose, but is a slow or accumulative poison, even when taken in medicinal doses for a length of time. It has been generally represented as causing emaciation even to a frightful extent; but though this has occurred in some instances, it does not seem to be frequent, if we except the absorption of certain glands, especially the mammæ of females.

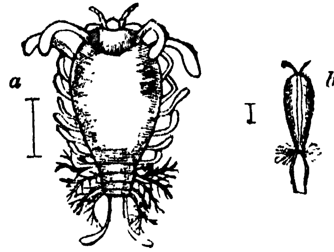
The diseases in which it has been found useful are glandular swellings, especially bronchocele or goître, which rarely resists its action; in some strumous diseases, in chronic rheumatism, and also as an antidote against poisoning with strychnia, brucia, and verataria: but its claims to confidence are not clear in case of such formidable poisons. It is often of use in lessening the injurious effects of mercury and in the treatment of the sequelæ of syphilis. (See Lugol, *On Scrofula.*)

IONA, also known by the names of I-Colm-Kill and Hii or I, is one of the Hebrides, in the district of Mull, and belonging to the shire of Argyle. It is situated on the western side of the Isle of Mull, from which it is separated by a narrow channel called the 'Sound of I.' Its length is three miles, and at its widest part it is about one mile in breadth. The general aspect of the country is rugged and mountainous, and the surface for the most part consists of moor and bog occasionally varied by a patch of green pasture. The village is a miserable collection of huts inhabited by a population of about 450 people. There seems to be no doubt that the island was antiently inhabited by Druids, who were expelled by the Christians about the time that St. Columba came to Britain (A.D. 565), and the inhabitants still point out the spot where this holy man is traditionally said to have been interred. The religious institutions established by the Christians remained unmolested for nearly 200 years; but about the beginning of the ninth century the Danes made a descent upon the island, and, with their accustomed barbarity, put to death the greater part of the monks, forcing the remainder to seek safety in flight. At the dissolution of the monastic institutions the revenues were united to the see of Argyle, and upon the abolition of episcopacy they became the property of the duke. At the present time the island is chiefly interesting on account of its numerous architectural and other antiquities, for a full account of which we must refer the reader to Dr. Macculloch's 'Highlands and Western Isles of Scotland.' The cathedral or abbey church is surmounted by a lofty tower, which is supported by four arches adorned with figures in basso rilievo. The choir is handsome, and the large eastern window is a beautiful specimen of the Gothic style, although its light and elegant workmanship has been much injured by time. In the fore court are two finely cut crosses; one called St. Martin's is formed of a single piece of red granite, 14 feet in length. The cathedral itself is dedicated to St. Mary, and, according to Boethius, was built by Malduinus in the seventh century, but Dr. Macculloch thinks this at least seven centuries too soon.

(*Beauties of Scotland;* Macculloch's *Highlands*, &c.)

IONE, or as it is sometimes written, JONE, a parasitic genus of crustaceans, placed by Desmarest under the *Isopoda*, but by Latreille, who established the subgenus, under the *Amphipoda*. The latter founded his separation on the figure given by Montagu under the denomination of *Oniscus thoracicus* (*Linn. Trans.*, ix. iii., 3, 4); and observes that it presents particular characters which place it at a distance from all the other forms of the order. The body is composed of about fifteen joints, which are only to be distinguished by lateral incisions in the form of teeth. The four antennæ are very short: the external ones, longer than the two others, are only visible when the animal is seen on the back. The two first segments of the body in the female are each provided with two elongated, fleshy, flattened, oar-like cirrhi. The feet are short, hidden under the body, and hooked. The six last segments are furnished with lateral, fleshy, elongated, fasciculated appendages, which are simple in the males, but in the form of oars in the other sex. At the posterior extremity of the body are six other appendages, which are simple and curved, two of them being longer than the others. The abdominal valves are very large, cover all the lower part of the body, and form a species of receptacle for the eggs.

Habits.—This parasite hides itself under the shell of *Callianassa subterranea* [CALLIANASSA], and there forms a tumor on one of its sides. Montagu extracted it, and kept it alive for some days. The females are always accompanied by their males, which are very inferior in size, and fix themselves firmly upon the abdominal appendages of the former by means of their claws. Latreille, whose account we have given, speaks of it as rare, and remarks that in its habits it approaches to *Bopyrus*. [ISOPODA.]



Ione thoracica. *a*, Female; *b*, Male. (Montagu, *Linn. Trans.*)

N.B.—M. Milne Edwards (ed. Lamarck, 1838) remarks, that all the figures referred to are copied from those of Montagu, and are very bad. Montagu states that the crustacean on which these parasites are found is rare, but that, in the few that he had obtained, two or three pairs of the parasites had occurred.

IO'NIA and IONIANS. Ionians is the name of one of the various peoples included in antient history under the general name of Hellenes or Greeks. [ACHÆI; ÆOLIANS; DORIANS.] The origin of the Ionians is involved in great obscurity. The name only occurs in the Iliad once, and in the form 'Iaones' (N. 685); but not many years after the war of Troy, the Ionians appear as settled in Attica, and also in the northern part of the Peloponnesus, along the coast of the Corinthian Gulf. Herodotus (viii. 44) says that the Athenians were originally Pelasgi, but that after Ion, the son of Xuthus, became the leader of the forces of the Athenians, the people got the name of Ionians. It appears probable that the Ionians, like the Æolians, were a conquering tribe from the mountains of Thessaly, and that at an unknown period they migrated southwards and settled in Attica and part of the Peloponnesus, probably mixing with the native Pelasgi. The genealogy of Ion, the reputed son of Xuthus, seems to be a legend under which is veiled the early history of the Ionian occupation of Attica. Euripides, in order to flatter the Athenians, makes Ion the son of Apollo. Whatever may be the historical origin of the Ionian name, Athenians and Ionians came to be considered as one and the same people. [ATHENS.] In the Peloponnesus the Ionians occupied the northern coast of the peninsula, which was then called Ionia, and also Ægialæan Ionia; and the sea which separates Peloponnesus from Southern Italy assumed the name of Ionian Sea, a circumstance which would seem to indicate the extent and prevalence of the Ionian name. This appellation of Ionian Sea was retained among the later Greeks and the Romans, and it is perpetuated to the present day among the Italians. When the Dorians invaded the Peloponnesus, about 1100 years B.C., the Achæi being driven from thence gathered towards the north, and occupied Ionia, which after that time took the name of Achæa. The Ionians of the Peloponnesus emigrated to Attica, whence, being straightened for want of space, and perhaps also harassed by the Dorians, they resolved to seek their fortune beyond the sea, under the guidance of the sons of Codrus, the last king of Athens. This was the great Ionian migration, as it is called. The emigrants consisted of natives of Attica, as well as of Ionian refugees from the Peloponnesus, and a motley band from other parts of Greece (Herod. i. 146). But this migration can perhaps hardly be considered as one single event: there seem to have been many and various migrations of Ionians, some of which were probably anterior to the Dorian conquest. Thus the Ionians established colonies in most of the Cyclades, such as Naxos, Andros, Paros, and Delos, and also in Eubœa. The emigrants who proceeded to the coast of Asia, under their leader Neleus, took Miletus, which was then inhabited by the Carians. Miletus seems to have fallen to the share of the Athenian Ionians, who, according to the frequent custom of those times, massacred all the men, and kept the women for themselves. They also colonized Myus and Priene, near the banks of the Mæander. Another party of Ionians under Androclus took possession of Ephesus, and drove away the Leleges and

Carian inhabitants. [EPHESUS.] They likewise occupied Lebedos and Colophon, the latter of which towns was inhabited by Cretans, who appear to have amalgamated with the Ionian colonists. Further north Teos, which had been built by the Æolians, received also an Ionian colony, as well as Erythræ on the coast facing the island of Chios. On the north coast of the same peninsula Clazomenæ was founded afterwards by a colony from Colophon, and later still Phocæa was colonized by adventurers from Phocis and Ionians from Attica on a territory north of the Hermus, which belonged originally to the Cumæans of Æolia. The above towns, with the two islands of Chios and Samos, which the Ionians likewise colonized, formed the confederation of the twelve cities of Ionia. Smyrna being seized by Colophonian exiles (according to Herodotus), was in course of time added to the confederation. Other colonies from the twelve cities were built along the coast, such as Geræ, Myonnesus, Claros, &c.

This confederation appears to have been mainly united by a common religious worship and the celebration of a periodical festival; and it seems that the deputies of the several states only met in times of great difficulty. The place of assembly was the Panionium, at the foot of Mount Mycale, where a temple, built on neutral ground, was dedicated to Poseidon. In the old Ionia (afterwards called Achæa), Poseidon was also the national deity, and his temple continued at Helice till that city was destroyed by the great earthquake. That the settlers in Asia should retain their national worship is a circumstance perfectly in accordance with the history of colonization, and confirmatory, if confirmation were wanted, of the European origin of the Ionians of Asia. We have no materials for a history of these cities of Ionia as a political community, and no reason for supposing that their political union came near the exact notion of a federation, as some have conjectured.

Asiatic Ionia extended from the Cumæan gulf on the north to Mount Grius and the gulf Basilicus south of Miletus, a length of not more than 100 miles in a straight line, but with a coast three times that length, owing to the many sinuosities and the form of the large Chersonesus opposite Chios. The Ionian territory did not extend inland above 40 miles from the coast as far as Mounts Sipylus and Tmolus. It bordered on the north upon the territory of Pergamus, Cumæ, and other Æolian cities which had been colonized several generations before the Ionian immigration, and on the south upon Caria, where the Dorian colonies formed, some time later, a small confederation. The principal rivers of Ionia were the Hermus, the Caystrus, and the Mæander, all three flowing from the interior with a western course into the Ægean. [ANATOLIA.]

The Asiatic Ionians early attained a high degree of commercial and maritime prosperity. Miletus alone is said to have founded 75 towns or colonies. They became wealthy, refined, and luxurious. The remains of their monuments prove their taste for the arts, and their temples and public buildings rivalled those of European Greece. The literature of Greece may be said to have originated on the coast of Asia Minor. The historian Hecatæus was a native of Miletus; Thales, one of the earliest philosophers, was from the same country. Anacreon was a native of Teos; and Herodotus, though a Dorian, adopted, in his History, the language of his Ionian neighbours.

The Lydian kings, whose capital was at Sardis, made war against the Ionian states, who only obtained peace and preserved a kind of independence by paying tribute, but they were finally subdued by Crœsus. They remained faithful to the Lydians, when attacked by Cyrus (B.C. 546), in consequence of which, that monarch having subdued the Lydians, sent his general Harpagus to reduce Ionia. Harpagus took and destroyed Phocæa, and the surviving inhabitants fled by sea, and founded Massilia (Marseille) on the coast of Gaul. About the same time many of the Teians left their country and founded Abdera in Thrace. Priene was taken by Harpagus, and the inhabitants were sold as slaves. Miletus and the other cities obtained peace on the same conditions as they had accepted under the kings of Lydia. In almost every town there were two parties, aristocratic and democratic, and the Persian kings or their satraps generally favoured the former, and thus it happened that most of the Greek cities in Asia came to be ruled by tyrants, or individuals who possessed the sovereign power. Aristagoras, who was deputy tyrant of Miletus in the time of the first Darius, having quarrelled with the Persian satrap, urged his fellow-countrymen the Ionians to revolt, to expel their tyrants, and to establish democracy. He set the example by resigning his power. Hecatæus, who saw the danger of rousing the formidable power of Persia, in vain opposed this rash measure. Aristagoras proceeded to Athens, and obtained the assistance of a fleet. The Athenians and Ionians united marched to Sardis, and plundered and burnt the city, but the Persians coming in great force, the confederates were defeated, and the Athenians withdrew from the contest. The Ionian fleet was strong at sea, but could not prevent the satrap Artaphernes from attacking and taking their cities by land. Clazomenæ was taken and destroyed, but the inhabitants some time after built a new town upon an island near the coast. Miletus was captured after a gallant defence, most of the inhabitants were killed, and the rest were transplanted into Persia, where Darius gave them lands and a settlement. The territory of Miletus was given up to Persian or Lydian colonists. Thus ended, about 494 B.C., the Ionian revolt, which lasted six years. Miletus however seems to have recovered from its ruin after a time, and the victories of the Greeks over Xerxes had the effect of restoring the fugitives to their respective cities.

After the battle of Mycale (B.C. 479), and the victories of Cimon, the Greeks became absolute masters of the sea, and the Persians did not venture near the coast. The Athenians, who had taken the lead in the close of the Persian war, now obtained a kind of supremacy on the eastern coast of the Ægean, and the Ionian cities acknowledged Athens as their leader and the arbiter of their disputes. At the close and after the conclusion (B.C. 404) of the Peloponnesian war, the Lacedæmonians gained the ascendency, and the towns of Asia changed protectors. Accordingly we find Agesilaus reconciling their intestine feuds, and professing, as the object of his expedition into Asia, to secure their independence. But by the peace of Antalcidas, 387 B.C., the towns on the continent of Asia were given up to the king of Persia, who however does not appear to have treated them harshly, for many of them were in a prosperous state at the time of Alexander's expedition. After the battle of the Granicus the democratic party at Ephesus and other towns resumed the upper hand, and Alexander gave them his countenance, at the same time forbidding them strictly from offering any further violence to the vanquished aristocracy. Miletus alone did not submit; it sent proposals however to Alexander, offering to remain neutral, but the conqueror sternly repulsed the proposal: the town was taken by storm, and most of the inhabitants put to the sword. It does not seem to have ever after completely recovered from that blow; and the gradual deposits of the Mæander, which have totally changed the appearance of the coast, contributed to its depression. Miletus, once a seaport town, is now eight miles from the sea, and the island of Lade, which stood at the entrance of its harbour, is become part of the mainland. Miletus however was still a town of some consequence under the Romans, and under the Byzantine emperors, till the twelfth century, when it was ravaged by the Turks. There are now only a few huts amidst its ruins inhabited by some Turkish families, but the place retains the pompous name of Palatska, or 'the palaces.' Chandler found remains of a vast theatre, and also of the famous temple of Apollo Didymæus in its neighbourhood, with several of the columns still standing. Under the Roman empire several of the other cities of Ionia still maintained the rank of wealthy cities, such as Smyrna and Ephesus. The best account of the actual state of the remains of the Ionian cities is in Chandler's *Travels in Asia Minor*, and the *Ionian Antiquities*, published by the Dilettanti Society, 2 vols. fol., with handsome plates. (See also Leake's *Map of Asia Minor;* Macfarlane's *Constantinople in* 1828; and Chishull's *Asiatic Antiquities;* Herodotus, i. 141-151; Strabo, lib. xiv.; Pausanias, vii. 1-5.)



Coin of Clazomenæ.

British Museum. Actual Size. Gold. Weight, 88 grains.

IONIAN ISLANDS is the name given to the Seven islands of Corfu, Cephalonia, Zante, Santa Maura, Ithaca,

Paxo, and Cerigo, which are scattered along the coast of Epirus and of the Peloponnesus. The name is probably derived from their being situated in that part of the Mediterranean which stretches between Greece and Calabria, and which from antient times has received the name of the Ionian Sea. [IONIA.] These islands are described under the several heads of CEPHALONIA, CORFU, ITHACA, ZANTE, &c. Under the head CORFU an account is given of the present constitution and administration of the republic of the United Ionian Islands under the protection of Great Britain. The following is a general view of the population, extent, produce, trade, and education of these islands.

Population.—A statement of the area, population, &c. of each island in 1834:—

ISLANDS.	Area in Square Miles.	Total Population.		Aliens and Resident Strangers (included in the Total Population).	Population to the Square Mile.	Persons employed in			Births.	Marriages.	Deaths.
		Males.	Females.			Agriculture.	Manufactures.	Commerce.			
Corfu	227	32,909	27,981	9,040	264	15,077	1621	1443	2507	597	1672
Cephalonia . . .	348	30,875	25,951	348	163	12,689	1471	835	1567	286	799
Zante	156	18,991	16,632	1,217	228	7,672	1947	421	974	284	1181
Santa Maura . .	180	9,592	8,258	195	100	2,158	132	470	525	110	811
Ithaca	44	4,902	4,664	108	217	1,407	196	931	246	52	128
Cerigo	116	4,091	4,488	37	74	1,522	261	198	248	61	118
Paxo	26	2,560	2,501	223	195	217	198	65	175	34	109
Total . .	1097	103,920	90,475	11,168	177	41,012	5829	4363	6242	1424	4818

Produce, Exports, Imports, &c.—The principal articles of export from the islands are olive oil and currants. Oil is chiefly the produce of Corfu, but in all the islands the olive-tree is more or less cultivated. Cephalonia and Zante are the only islands in which currants are grown, with the exception of Ithaca and Santa Maura, in which a few acres are employed in that cultivation.

ISLANDS.	CROPS.—Number of Acres of Land under each Kind of Crop.											
	Wheat.	Indian Corn, Calambocchio, Barley, and Wheat.	Oats.	Currants	Olives.	Vines.	Cotton.	Flax.	Pulse.	Pasture.	Total in Crop.	Total Uncultivated.
Corfu	4,005	13,508	2,963	..	75,700	13,900	69	843	1,020	17,422	112,008	33,272
Cephalonia . .	682	6,963	637	6,212	4,323	12,232	473	351	1,033	610	32,934	189,786
Zante	7,182	966	492	6,410	16,766	13,600	327	134	64	1,474	45,971	53,869
Santa Maura . .	1,234	3,249	386	8	8,143	4,127	111	75	212	5,494	17,539	97,661
Ithaca	49	263	5	190	212	756	1	97	38	1,626	1,611	3,286
Cerigo	453	8,466	..	..	513	1,365	54	109	1,595	5,285	12,555	61,685
Paxo	..	..	..	..	11,000	406	..	..	..	..	11,406	5,234
Total . .	13,605	33,415	4,475	12,880	116,657	46,386	1,035	1,609	3,962	31,941	234,021	444,793

Total Produce.—Wheat, 234,727 bushels; Indian corn, &c., 177,065 bushels; oats, 23,944 bushels; currants, 15,071,400 lbs.; oil, 253,923 barrels; wine, 306,822 barrels; cotton, 45,145 lbs.; flax, 94,522 lbs.; pulse, 19,826 bushels; salt, 114,193 lbs.

The exports from the Ionian Islands in 1833 amounted to 250,669*l.*, and consisted principally of olive oil, currants, wine and spirits, soap, and some other articles of less importance.

The imports into the Ionian Islands in 1834 amounted to 563,611*l.*, and consisted of sugar, coffee, cotton and woollen goods, earthenware, hardware, timber, wheat, rice, cheese, cattle, sheep, and a variety of other articles.

Education.—The following is the number of schools, &c., as they existed in 1834:—

ISLANDS.	Public or Free Schools.							Private Schools.			
	Number.	Number of Scholars			Mode of Instruction.	Mode of Support.	Total Expenses.	Number	Number of Scholars.		
		Males.	Females	Total.					Males.	Females	Total
Corfu . . .	4	294	..	294	Classical and Lancasterian.	Wholly by the Government.	£3,261	67	1,955	353	2,308
Cephalonia . .	12	445	59	504			867	73	1,207	..	1,207
Zante . . .	2	150	..	150			623	38	666	325	991
Santa Maura .	2	126	..	126			537	17	426	71	497
Ithaca . . .	2	258	..	258			331	9	312	22	334
Cerigo . . .	9	394	9	403			295	2	17	55	72
Paxo . . .	5	122	49	171			258	..	..	..	..
Total .	36	1789	117	1906			6,172	206	4,583	826	5,409

At Corfu there is a university, and also an ecclesiastical seminary for the education of young men intended for the priesthood of the Greek church. Each of the islands also has a school, entitled 'Secondary,' in which the scholars are instructed in the Greek and Latin classics, in the modern Greek, English, and Italian languages, and in arithmetic and elementary mathematics. In the chief town of each island there is a central school, on the mutual instruction plan, for teaching reading, writing, and arithmetic.

Besides these schools, conducted entirely at the public expense, there are in each island district schools on the same plan as the central schools, where similar instruction is given, and the expense is defrayed by the parents of the children. The terms per scholar vary greatly, and the payment is frequently made in kind. Government also contributes to the establishment of these schools by furnishing books, slates, benches, &c., and, where no suitable church exists for the purpose, by providing a school-house.

The district and village schools are under the immediate superintendence of the head master of the central school in each island, and there is an inspector-general of all these schools. The whole of the establishment for education is under the general direction of the commission for public instruction.

The only coinage of the states is a copper currency of farthings to the amount of 10,000*l.* The general circulating medium consists of Spanish dollars. Some British silver coin has also been put into circulation, but the greater part has been withdrawn for remittances to Malta and to England.

The Troy pound of 5760 grains is the standard weight: 24 of these grains make 1 calco; 20 calchi 1 ounce; and 12 ounces 1 libbra sottile, or pound light weight, equal to 1 lb. Troy. The libbra grossa, or great pound, contains 7000 grains, and is therefore equivalent to the pound avoirdupois; 100 lbs. (libbra grossa) are called a talento. The English imperial standard yard is the standard linear measure, with the divisions into 3 feet and 36 inches: 5½ yards are 1 camaco; 220 yards 1 stadio; and 1760 yards 1 mile. The imperial gallon is the measure of capacity: 1 gallon is equal to 8 dicotoli. An Ionian barrel contains 16 gallons, or 128 dicotoli.

IONIAN SCHOOL comprises several of the earliest philosophers of Greece, whose speculations were predominantly of a physiological character, and who, with one or two exceptions, were natives of the Ionian colonies in Asia Minor. From this purely external circumstance the school has derived its name, and its members have been brought into an unbroken connexion of masters and disciples by the learned labours of the later Greeks, who strove to give to the first development of philosophy the same orderly transmission of doctrine which prevailed in the later schools. Accordingly Anaximander is made the scholar of Thales and the teacher of Anaximenes, who had two disciples, Diogenes of Apollonia in Crete, and Anaxagoras, whose disciple was Archelaus of Athens, or Miletus, in whom the school closes. Now, not to mention that this purely artificial arrangement omits Heraclitus, the chief of the Ionians, it is also open to great difficulties both of doctrine and chronology. As regards the latter however, we shall only advert to the general difficulty, that between six and seven generations (212 years) are occupied by the lives of Thales, Anaximander, Anaximenes, and Anaxagoras. The incongruity of the received arrangements appears at once on the slightest consideration of the doctrinal systems of the philosophers of this school. Agreeing in the hypothesis of a primeval state of things, they differed widely in the mode in which they accounted for the deduction of existing phenomena out of the primal substance. One theory endued the universe with life, and considered the orderly procession of all things to be a spontaneous development of a pre-existent germ of life. A second accounted for all apparent alteration in the form and qualities of natural bodies by certain changes in the outward relations of space, and proceeded on the supposition of certain permanent material elements which change place in obedience to motion, either originally inherent in or extrinsically impressed on the mass. The latter is the mechanical, the former the dynamical theory of nature. Of the dynamical theorists, Thales first of all taught that all things are pregnant with life; that the seed or germ of vitality, which is in all things, is water, because all seed is moist and humid. Of this potentially living entity Anaximenes advanced a still worthier representation, and taught that the primal substance is infinite and sensuously imperceptible. This principle is analogous to the animal soul, and as the animal soul governs the body, so the universal soul rules and embraces all things. Diogenes made a still farther advance, and maintained that the harmony and design of the mundane fabric suggest the unity and intelligence of its first principle. This principle however he considered as simply physical, and only distinguished from natural phenomena in this, that while it is infinite, as the principle of all, they are finite. Still bolder was the flight of Heraclitus, who taught that the world is an everliving being, a rational fire, whose vitality involves a tendency to contraries, and is ever passing from want to satiety.

The mechanical theory is first opened by Anaximander, who flourished not long after Thales, who conceived the ground both of production and motion to be an eternal substance, which he called the infinite, and wherein the immutable elements were indistinguishably combined. Out of this chaos certain primary contraries, as he conceived them, cold and warm, earth and heaven, were first evolved, and in the course of certain separations and combinations alternately proceeding, more perfect forms are spontaneously developed, to be ultimately resolved into the homogeneous primary. After a long interval of a century Anaxagoras revived the mechanical physiology, and distinctly advanced the principle on which it rests, that nothing is changeable, but that the nature of every thing is permanent. Seizing the contrariety of the moving and the moved, which the mechanical theory is so well calculated to exhibit, he defined the latter to be extended antitypous bulk, inert body, infinitely multiple both in qualities and parts. The moving principle, on the contrary, is perfect, simple, and homogeneous—soul or spirit, which, as moving the elements into combinations of order and beauty, is endued with the faculty of knowing and surveying whatever was, and is, and shall be. Archelaus rather abandoned than advanced the views of his master Anaxagoras, and in him, as the teacher of Socrates, the Ionian school became extinct before the more extensive development of the Socratic philosophy. (Ritter, *Geschichte d. Ionischen Philosophie;* and Brandes, *Geschichte d. Griech.-Röm. Philos.*)

IONIAN SEA. [IONIA.]

IONIC DIALECT, the softest of the four written varieties of the Greek language, was spoken in the Ionian colonies of Asia Minor, and in several of the islands of the Ægean Sea. As the new Ionic, it is distinguished from an older, which was the common origin of itself and the Attic. The old Ionic was widely diffused, and its use was co-extensive with the Ionian settlements in the Peloponnesus and Northern Greece. (Thirlwall, *History of Greece*, i., 123.) The language of epic poetry arose out of this original tongue, which after the Dorian conquest passed, on the one hand, with the fugitives into Asia Minor, while, on the other, it continued to be spoken, for awhile at least, by the conquered peasantry who remained in Greece Proper. This tradition, which however, like most of the earlier traditions of Greece, is involved in great obscurity, may perhaps serve to explain (what in the common legends of Homer is otherwise inexplicable) the similarity of the language employed by Homer and Hesiod, who, though near to each other in time, were widely separated in the supposed scenes of their poetical labours. (*Ibid.*, ii. 120.) This first matured form of the Ionic has been called the epic, and was faithfully adhered to as the standard of Greek epic and elegiac composition by all subsequent writers of epos or elegy, which also owed its birth to Ionians.

On the formation of the new Ionic, or simply the Ionic, great influence was exercised by the commerce of the Ionians, and especially by their intercourse with the soft and effeminate Asiatics. Neglecting the combination of strength with softness which gave to the epic dialect its characteristic fulness of tone, the Ionians attended only to mellowness and euphony, to attain which it softened the aspirates, accumulated vowels, and laid aside every broader and harsher sound. Herodotus (i. 142) distinguishes four varieties (*χαρακτῆρες γλώσσης*) of the new Ionic, in one of which he wrote, and, though a Dorian, has left us the best and most complete specimen of it. [HERODOTUS; HIPPOCRATES.]

IONIC ORDER. [CIVIL ARCHITECTURE; COLUMN.]

IONI'DIUM, a genus of violaceous plants, inhabiting the tropical parts of America. It resembles Viola itself in most respects, but its sepals are not prolonged at the base into appendages, and the lower petal is not spurred. Several species are used medicinally. I. Ipecacuanha and some others have emetic roots.

IÖRA, or JORA, a genus of birds established by Dr. Horsfield, and placed by Mr. Swainson among his *Brachypodinæ*, or short-legged thrushes. [MERULIDÆ.]

IOS. [ARCHIPELAGO, GRECIAN.]

IPECACUANHA is an emetic substance, the root of several plants growing in South America. All the kinds have nearly the same ingredients, but differ in the amount of the active principle which they respectively contain, termed emeta. The best is the annulated, yielded by the Cephaëlis Ipecacuanha, a small shrubby plant, native of Brazil and of New Granada. Of this sort there are three varieties, namely, the brown, red, and grey, or grey-white, called also greater annulated ipecacuan. As this is the only sort sent from Rio Janeiro, it is sometimes called Brazilian or Lisbon ipecacuan. It is sent in bales and barrels

The root is in pieces from two to six inches long, and about the thickness of a straw, much bent or twisted, either simple or branched, with a remarkably knotty character, owing to numerous circular depressions or clefts, which give the whole an appearance of a number of rings; and hence the term annulated. It consists of a central axis called *meditullium*, and an external portion, called the *cortical* part. Each contains emeta; but by far the greater portion exists in the cortical. Of the three varieties of annulated ipecacuan the brown contains 16 per cent. of emeta, while the red contains only 14 per cent.: the grey has not been analyzed.

Another sort of ipecacuan is obtained from the Psychotria emetica: this kind contains only 9 per cent of emeta, and the undulated or amylaceous ipecacuan, the produce of the Richardsonia scabra, holds only 6 per cent. of emeta, with 92 per cent. of starch. Besides these, the roots of numerous other plants are used in tropical countries as emetics, and often termed ipecacuan.

The dust or powder of ipecacuan applied to any mucous surface causes irritation and increased secretion from the part. It is chiefly employed to excite the stomach either to augmented secretion, or to invert its action, and effect vomiting. It is also capable, by being combined with other substances, of being directed to the skin, and producing increased perspiration. When given in very small doses, it improves the appetite and digestive powers; in a somewhat larger dose, it acts on the intestines; but in a still larger, it inverts the action of the stomach, and occasions vomiting. It may therefore be used in a great many diseases, such as indigestion, dysentery, rheumatism, common colds, croup, &c. [EMETA; EMETICS; DIAPHORETICS; ANTIDOTES.]

IPHICRATES, an Athenian general, most remarkable for a happy innovation upon the antient routine of Greek tactics, which he introduced in the course of that general war which was ended B.C. 387 by the peace of Antalcidas. This, like most improvements upon the earlier methods of warfare, consisted in looking, for each individual soldier, rather to the means of offence than of protection. Iphicrates laid aside the weighty panoply, which the regular infantry, composed of Greek citizens, had always worn, and substituted a light target for the large buckler, and a quilted jacket for the coat of mail; at the same time he doubled the length of the sword, usually worn thick and short, and increased in the same, or, by some accounts, in a greater proportion, the length of the spear. It appears that the troops whom he thus armed and disciplined (not Athenian citizens, who would hardly have submitted to the necessary discipline, but mercenaries following his standard, like the Free Companions of the middle ages), also carried missile javelins; and that their favourite mode of attack was to venture within throw of the heavy column, the weight of whose charge they could not have resisted, trusting in their individual agility to baffle pursuit. When once the close order of the column was broken, its individual soldiers were overmatched by the longer weapons and unencumbered movements of the lighter infantry. In this way Iphicrates and his targetiers (peltastæ), as they were called, gained so many successes that the Peloponnesian infantry dared not encounter them, except the Lacedæmonians, who said in scoff that their allies feared the targetiers as children fear hobgoblins. They were themselves taught the value of this new force, B.C. 392, when Iphicrates waylaid and cut off nearly the whole of a Lacedæmonian battalion. The loss in men was of no great amount, but that heavy-armed Lacedæmonians should be defeated by light-armed mercenaries was a marvel to Greece, and a severe blow to the national reputation and vanity of Sparta. Accordingly this action raised the credit of Iphicrates extremely high. He commanded afterwards in the Hellespont, B.C. 389; in Egypt, at the request of the Persians, B.C. 374; relieved Corcyra in 373, and served with credit on other less important occasions. (Xen., *Hell.*; Diod.; Corn. Nep.)

IPHIS. [LEUCOSIANS.]

IPOMÆA, a genus of plants of the natural family of Convolvulaceæ, which is very closely allied to Convolvulus, or Bindweed, whence has been derived its name. From the more minute investigations of modern botanists considerable changes have taken place in the nomenclature of the species sometimes referred to this genus and sometimes to other nearly allied genera. M. Choisy, who has most recently examined the Oriental Convolvulaceæ, excludes many species usually referred here, and forms the genus of the species of Ipomœa and Convolvulus of authors. Ipomæa has a 5-sepaled calyx, a campanulate corol, with five stamens included within it. Style single; stigma bilobed; lobes capitate; ovary 2-celled; cells 2-seeded; capsule 2-celled. The species are very numerous, and found in the tropical parts of Asia, Africa, and America. A few ascend the mountains in such latitudes.

Most of the species are ornamental; others have been removed to Quamoclit, Argyreia, Pharbitis, &c., and one of the most useful as an article of diet in tropical countries, to Batatas. B. edulis produces the tubers so well known by the name of *Sweet Potatoes*.

Like the kindred genus Convolvulus, which affords us scammony, many of the species of Ipomæa are useful for their purgative properties: thus the Jalap plant is of this genus; and in India, I. Turpethum and cærulea are useful for similar purposes. Of the last the seeds only are employed, and form the *hub-al-nil* of Arabian authors, which has been usually translated *granum Indicum*. *I. Turpethum*, probably so called from the Arabic *toorbud*, which is itself no doubt derived from the Sanscrit tripoota (from *tri*, three, and *poota*, the coat of a seed), or from *trivrit*, another name, as the plant is an Indian one, and its root has been long employed in India as a common purgative. The bark of the roots is the part employed by the natives, as it contains all the active properties, which they use fresh, rubbed up with milk. About six inches in length of a root as thick as the little finger they reckon a common dose. (Roxb.) It is reckoned an excellent substitute for Jalap, and is free from the nauseous taste and smell of that drug. The plant is a native of all parts of Continental and probably of Insular India also, as it is said to be found in the Society and Friendly Isles and the New Hebrides. (*Fl. Ind.*, ed. Wall. 2, p. 59.)



Ipomæa Jalapa.

I. Jalapa is a species which has only recently been accurately determined, though its root has so long and so extensively been employed as a powerful medicinal agent. The drug being exported from Vera Cruz was supposed to be produced in the hot country in its immediate neighbourhood, or in that of Xalapa, and *I. macrorhiza* of Michaux was supposed to be the plant, though this grows also in Georgia and Florida, where no jalap has ever been produced, and its root weighs from 50 to 60 lbs. This was sufficient to prove that it could not be the source of the officinal drug, which is seldom larger than the fist. Hum-

boldt was however well aware that 'the true Purga de Xalapa delights only in a temperate climate, or rather an almost cold one, in shaded valleys, and on the slope of mountains' (*New Spain*, vol. iii.); and the fact is important as showing that a temperate and not a hot climate is required for its cultivation elsewhere. Dr. Coxe, of Pennsylvania, received in 1827 directly from Xalapa several small Jalap plants, one of which he succeeded in growing to maturity, and which was ascertained by Dr. Nuttal to be an Ipomœa, and named by him *I. Jalapa*. Specimens and seeds, of which the latter have produced plants, were subsequently procured by Dr. Schiede from Chiconquiera, on the eastern declivity of the Mexican Andes, at an elevation of 6000 feet. This plant, it is now ascertained, was also known to Miller from seeds sent by Dr. Houston from Mexico, as in the 'Gardener's Dictionary' a plant agreeing in description with the true Jalap plant, and with smooth leaves, is described. The root of this plant is a roundish somewhat pear-shaped tuber, externally blackish, internally white, with long fibres proceeding from its lower parts. The stem is much disposed to twist, and rises to a considerable height upon surrounding objects. The leaves are heart-shaped and pointed, deeply sinuated at the base, entire, smooth, prominently veined upon their under surface, and supported upon long footstalks. The flowers are of a lively purple colour, and stand upon peduncles as long as the petioles. [CONVOLVULUS JALAPA.]

IPSAMBUL. [ABOUSAMBUL.]

IPSUS, BATTLE OF. [ANTIGONUS, p. 103.]

IPSWICH, a parliamentary borough and corporate town, capital of the county of Suffolk, and distant 69 miles north-east from London, is agreeably situated on the side of a hill near the junction of the rivers Orwell and Gipping. According to Camden, this town was antiently called Gippeswich, which name was derived from that of the neighbouring river Gippen, or Gipping, and thence gradually became changed into Yppyswyche and Ipswich. The town does not appear to be mentioned before the invasion of the Danes in 991, by whom it was pillaged, and the fortifications destroyed. In the Confessor's time, according to Domesday Book, 'Queen Ediva had two parts here, and earl Gwert a third, and there were 800 burgesses paying custom to the king.' The earliest charter conferred upon the town was granted by king John in the first year of his reign, and by it numerous privileges were acquired by the burgesses, of which privileges the chief were, that they should have a merchant's guild, with their own hanse; that no person should be lodged within the borough without the consent of the burgesses; that they should hold their lands and tenures according to the customs of free boroughs, &c. Henry III. increased the privileges of the burgesses, but in the reign of Edward I. the borough was seized by that monarch, on account of certain offences committed by the inhabitants, though it was afterwards restored to them with all its liberties. In the reign of Edward III. the municipal government appears to have been again taken away from the corporation, and committed to the sheriff of the county, by whom a keeper of the town was appointed, but the corporate government was soon restored, and the burghal privileges confirmed and extended by the subsequent charters of Richard II., Henry VI., Edward IV., Richard III., Henry VII. and VIII., Edward VI., Elizabeth, James I., and Charles I. In the reign of Charles II. this corporation, like many others, surrendered its charters and franchises to the king, but in the 36th year of his reign the borough was re-incorporated, with a new constitution, and by a charter of James II. the corporate officers were released from the oaths. The charters of John, Edward IV., Henry VIII., and 17 Charles II., as restored by the proclamation of James, are all considered as governing charters. By the 5 and 6 William IV., cap. 76, the council of the borough consists of a mayor, 10 aldermen, and 30 councillors. Ipswich has returned two members to parliament since the 25th year of Henry VI.

The revenue of the corporation, consisting of water rental, rents of lands, houses, mills, and other tenements, exceeds 2000*l.* per annum. The expenditure in 1828 amounted to 1529*l.* 19*s.* 1*d.*, and the corporation property is charged with a debt of 14,300*l.*

The streets of Ipswich, though well paved, and lighted with gas, are narrow and irregular, which is attributable to the remarkable circumstance that the town is not known ever to have suffered from fire, or even from the civil commotions which convulsed so many parts of the kingdom about the middle of the seventeenth century. There are many good buildings, and many extremely old, decorated with a profusion of curiously carved images. Most of the houses, even in the heart of the city, have convenient gardens adjoining them, which render it at once agreeable, airy, and salubrious. The water for the supply of the town rises from springs in certain lands which the corporation hold under long leases, and it is conveyed into the town by pipes laid down at their expense. The water rental, which forms a considerable part of the revenue of the corporation, has been the source of much discontent among the inhabitants, as the former claim a monopoly of the supply, and the latter complain that they are ill supplied. In the Report of the Commissioners on Municipal Corporations, 1835, the police of the town is described as being particularly inefficient.

The manufactures of the town consist chiefly in the spinning of woollen yarn, ship-building, sail-making, &c. Its commerce arises from the exportation of corn, malt, and other produce of the surrounding country. There is a harbour for light vessels formed by the æstuary of the Orwell, which is navigable at high water up to the bridge, except for vessels of large burthen, which lie at Downham Reach.

The principal public buildings are the churches of Saints Clement, Helen, Laurence, Margaret, Mary at Elms, Mary at Kay, Mary at Stoke, Mary at Tower, Matthew, Nicholas, Peter, and Stephen. To the northward of the church of St. Mary at Kay was formerly a house of Black Friars, called the Priory of St. Peter's. The extensive site of this convent was purchased by the corporation, and confirmed to them in 1572 by the appellation of Christ's Hospital. Part of this edifice is now occupied as an hospital for poor boys, in which they are maintained, clothed, and educated, but the number during the five years preceding 1835 had never exceeded sixteen. The revenue of the hospital is estimated at 400*l.* a year. In another part of the monastery is a spacious room wherein is deposited the town library, the keys of which are kept by the master of the grammar-school, and out of which every freeman is privileged to take away any book upon giving a proper receipt In the spacious refectory of the same building, and on the south side, is now held the Free Grammar-school, the date of the first establishment of which is not known, though it was certainly prior to the year 1477. But in 1524 Cardinal Wolsey having intimated to the university of Oxford his design of founding a college (now Christ Church), the priory of St. Peter's was surrendered to him in 1527, whereon he founded a school as a nursery for his intended college at Oxford, and this school is said for a time to have rivalled those of Eton and Winchester. Queen Elizabeth, in the second and third years of her reign, granted two charters for the regulation of the Grammar-school and of Christ's Hospital, At the present time the master has a salary of 150*l* a year; he is provided with a dwelling-house, and the appointment is for life. Since the Report of the Commissioners on Charities a committee has been appointed to investigate the endowments of the Grammar-school. They state that the original endowment under the charter of Queen Elizabeth was 38*l.* 13*s.* 4*d.* per annum, which with some subsequent bequests makes an aggregate annual income of 66*l.* 6*s.* 8*d.*; but it does not appear from what source the additional funds are derived in order to liquidate the master's salary of 150*l.* and to defray the other expenses of the establishment. Ipswich is in the diocese of Norwich. The livings are three rectories, of the respective annual net values of 326*l.*, 337*l.*, and 82*l.*, and seven paid curacies of the net value of 175*l.*, 115*l.*, 80*l.*, 103*l.*, 150*l.*, 138*l.*, and 103*l.* The borough is divided into fourteen parishes, the aggregate population of which in 1831 was 20,201 persons. (Gough's *Camden's Britannia*; Carlisle's *Endowed Schools*; *Beauties of England and Wales*; *Parliamentary Papers*, &c.)

IRAK AJEMI. [PERSIA.]

IRAK ARABI. [BAGDAD.]

IRAPUATO. [MEXICO.]

IRELAND, the second in size of the British islands, and the second largest island of Europe, lies west of Great Britain, in the Atlantic Ocean. The general maps of Ireland at present published are too imperfect to give the means of stating its position more accurately than that it lies between 51° 25′ and 55° 22′ N. lat. and 5° 27′ and 10° 35′ W. long. The arm of the Atlantic which separates Ireland from Great Britain, and bounds it on the north-east, east, and

south-east, is narrowest at its northern extremity, where it is called the North Channel, and the opposite coasts approach within 14 miles, between the Mull of Cantyre in Scotland and Fair Head in the county of Antrim. Southward from this, that part of the channel which contains the Isle of Man expands to a breadth of 120 miles, between the coasts of Louth and Lancashire, and bears the name of the Irish Sea. Being again contracted by the projecting coast of Wales to a breadth of about 65 miles, it assumes the name of St. George's Channel, which it bears until it expands into the Atlantic at its southern extremity. The remainder of the coast-line on the north-west, west, and south-west is formed by the Atlantic Ocean. The chief lines of communication between Ireland and Great Britain are from Londonderry to Glasgow, 138 miles; from Belfast to Glasgow, 107 miles, and to Liverpool, 156 miles; from Donaghadee to Portpatrick, 21 miles; from Dublin to Liverpool, 130 miles, to Holyhead, 63 miles, to Port-Dinnlleyn, 70 miles; from Waterford to Bristol, 222 miles; from Cork to Bristol, 268 miles—sailing distances.

According to the Map published by the Society for the Diffusion of Useful Knowledge, the greatest length of Ireland, in a line nearly from north to south, is from Bloody Farland Point in the county of Donegal to the Old Head of Kinsale in Cork, 245 miles; and the greatest breadth, from Achill Head in the county of Mayo, on the west, to the mouth of Loch Strangford in the county of Down, a little to the north of east, 200 miles. In an oblique direction the greatest length is, from Fairhead in the county of Antrim to Mizen Head in the county of Cork, 306 miles, in a line bearing north-north-east by south-south-west. Pending the completion of the Ordnance Survey of Ireland, nothing can be stated with certainty regarding the area of Ireland. It is however estimated in the Map published by the Society for the Diffusion of Useful Knowledge, at 18,484,343 statute acres, or 28,881 statute square miles, of which 215,252 statute acres are under water. Another estimate made in 1831 is as follows:—

	Statute Acres.
Dry land	14,603,473
Unprofitable, mountain and bog	5,310,736
Lakes	455,399
Total .	20,399,608;

but this is probably above the true amount.

General Features.—The general form of the island is that of an oblique parallelogram, the longer diagonal lying between Mizen Head on the south-west and Fair Head on the north-east, and the shorter between Erris Head on the north-west and Carnsore Point on the south-east. The south-westerly portion of the island, which is most exposed to the Atlantic, is deeply indented with arms of the sea penetrating between rocky and mountainous promontories: the western shore in general is lofty and precipitous, and the eastern flat and little indented.

The most remarkable feature in the distribution of high and low land over the surface is the great limestone plain which occupies, with little interruption, almost the whole of the central district extending from the sea at Dublin on the east to the bay of Galway on the west, and from the counties of Sligo and Fermanagh on the north to the confines of Cork and Waterford on the south. The chief mountain-groups are either external to this plain, or rise in insulated ridges near its borders. Commencing from Dublin, where it touches the sea, the first interval between the limestone country and the Channel is occupied by the granite range of the Wicklow and Mount Leinster Mountains, which extends southward from the confines of Dublin and Wicklow into Carlow, and terminates near the confluence of the Barrow and Nore. From the flanks of this chain a clay-slate formation extends on the one hand into the eastern portion of Kildare, and on the other to the sea, forming the more cultivable portions of Wicklow, and almost the entire of Wexford; this latter district is interspersed with protruded masses of quartz and greenstone. Abutting on the southern extremity of this granite range commences a series of mountain-groups skirting the limestone plain on the south. The main constituent of these elevations is clay-slate and old conglomerate supporting flanks of yellow sandstone. One group, that of the Gaultees in Tipperary, is entirely insulated by the limestone, which also occupies several longitudinal valleys of the external district and in some places penetrates to the sea. This is the most extensive mountain district of Ireland. Commencing from the east the Slievenaman, Knockmildown, and Gaultee ranges extend in successive elevations of from 2000 to 3000 feet across the south of Kilkenny, Tipperary, and Limerick; after subsiding under the coal district which spreads from Limerick over the north-east of Kerry, they rise again towards the Atlantic, where Mount Brandon terminates the series in a lofty promontory which separates the bay of Dingle from the mouth of the Shannon. Southward from these groups the same formation occupies the entire counties of Cork and Kerry; the elevations here towards the east are moderate and the country fertile, but they spread over a wider surface and attain a greater altitude as they trend towards the sea, occupying the whole western part of Cork and the southern portion of Kerry with precipitous and sterile ridges, among which MacGillicuddy's Reeks in Kerry rise to the height of 3404 feet, being the highest ground in Ireland. Northward from Dingle Bay the limestone district again touches the sea, but throughout the western parts of Limerick and Clare it is overlaid by the great Munster coal-tract, from under which it again emerges on the south side of the bay of Galway. North and west of Galway the space between the limestone plain and the sea is again occupied by mountains. An extensive tract of granite with peaks of quartz and greenstone rising to the height of 2400 feet forms the northern boundary of the bay of Galway, and from this point northward to Killalla Bay a series of primitive rocks consisting chiefly of mica-slate and protruded masses of quartz is interposed between the Atlantic and the inland plain, except in one instance where the limestone reaches to the sea through the low country connecting the plains of Mayo with the head of Clew Bay. A primitive ridge of mica-slate and granite, nearly surrounded by the limestone which intervenes between it and the coast, prolongs this district northward and westward through Sligo to within a short distance of the borders of Donegal, where it subsides to rise again in that extended primitive formation which occupies almost all the county of Donegal and a great part of the counties of Derry and Tyrone. The north-western portion of this district consists of granite and quartz with numerous veins of primitive limestone, which is also of frequent occurrence throughout the great field of mica-slate that constitutes the remainder and rises in mountains from 1500 to 2500 feet high. This district is succeeded on the east by the great trap-field of Antrim, which overlies it through an extent of nearly 800 square miles: the cap of trap is supported throughout by a bed of chalky white limestone reposing on lias, the denuded edges of which give an extraordinary variety of colouring and structure to the cliffs of that coast: the substratum of mica-slate protrudes from below the superincumbent masses at the north-eastern extremity of the field, and crossing the Channel re-appears in Scotland. The clay-slate tract which succeeds the trap-field on the south and west, extending over Down and Armagh into Monaghan, Louth, and parts of Cavan, Meath, Longford, and Roscommon, also re-appears on the opposite side of the Channel, forming the grauwacke district which extends from Portpatrick to St. Abb's Head on the Frith of Forth. The granite group of the Mourne Mountains and the granite and greenstone group of Slieve Gallion occupy a considerable portion of this clay-slate tract, protruding in conspicuous masses in the southern parts of Down and Armagh to a height of 2500 feet and upwards. This completes the circuit of the interior plain which extends between the last-mentioned district and Dublin to the sea.

The principal detached groups which occur within the limestone plain are the Slieve Bloom and Slieve Baughta ranges, consisting of nuclei of clay-slate supporting flanks of red and yellow sandstone, which extend to a considerable distance on each side of the valley of the Shannon in the counties of Tipperary and Queen's County, and Clare and Galway respectively. A tract of old red sandstone rises into a chain of moderate elevation on the borders of Roscommon and Sligo in the north-west part of the plain, and several greenstone elevations diversify its surface in the centre and south-west.

The limestone-plain likewise contains six coal-districts, the Leinster, or Castlecomer district, on the south-east; the Slieve Arda, or Tipperary district, on the south; the Munster district, extending through parts of the counties of Cork, Kerry, Limerick, and Clare, on the south-west; the Loch Allen district, round the source of the Shannon, on the north-

west; and the Monaghan and Tyrone districts, on the north there is also a coal district of small extent in the north-eastern extremity of the county of Antrim. The coal raised in the southern districts is anthracite, or blind-coal; that raised in the districts north of Dublin is bituminous.

In addition to these the central district of Ireland contains upwards of one million of acres of bog, comprehended for the most part within that portion which would be embraced by lines drawn from Wicklow to Galway, and from Howth-head to Sligo. The greater portion of these bogs lies west of the Shannon in the counties of Galway, Roscommon, and Mayo; the remainder, extending in various tracts through King's County, Longford, Westmeath, and Kildare, is known collectively as the Bog of Allen. Numerous ridges of limestone-gravel, called Eskers, surrounding these several divisions, offer an unlimited supply of the material best adapted for their improvement. It is calculated that an expense of 1*l.* 5*s.* per acre would be sufficient for the drainage of these bogs, which are at present inaccessible and useless for the purposes of turbary.

Besides these encumbrances the lower carboniferous limestone, which constitutes the central plain, is overlaid in many tracts towards the borders of the district by the upper or splintery limestone, and this is generally accompanied by a craggy and rough surface: such is the case in the vicinity of each of the coal districts and throughout the counties of Sligo, Fermanagh, Cavan, and Leitrim. These districts contain numerous caverns, and streams sinking into subterranean channels are here of frequent occurrence.

By much the greater part of the central plain however is unincumbered, and has the pure carboniferous limestone for its substratum. Throughout these districts the soil is rich and sweet, and the surface gently undulating. The mountain groups and waste lands on the whole occupy a comparatively small portion of the entire island, and many of the districts lying without the central plain rival the richest limestone lands in easiness of access and fertility.

Rivers and Lakes.—From the arrangement of the mountain groups round the borders of the central plain the courses of the greater number of the rivers of Ireland are necessarily short. Of those which drain the external districts the chief are the Blackwater and Lee in Cork, the Foyle in Donegal and Derry, the Bann and Lagan in Antrim and Down, and the Slaney in Wexford. The rivers of the central district have longer courses and a much greater body of water. The chain of Slieve Bloom and the low range of the Eskers divide the central plain longitudinally into two unequal portions, of which the western division is by much the greater. The eastern or smaller division is again subdivided by the summit-level of the bog of Allen into a northern district, the waters of which discharge themselves into the Irish Sea by the Boyne, and a southern district, which sends its drainage in an opposite direction into the Atlantic by the united streams of the Barrow, Nore, and Suir, all navigable rivers. The western division, which much exceeds the united basins of these several rivers, is drained solely by the Shannon, which, from its great body of water and course through a flat country, possesses the extraordinary advantage of being navigable from its source to its mouth, a distance of nearly 210 miles. Those portions of the central plain which lie beyond the basins of the Shannon and Boyne discharge their chief drainage into a series of lakes which skirt the limits of the limestone country on the west and north. The lakes of Galway and Mayo form such a series, separating the primitive district of Connaught from the plain on the west; the extended line of Loch Erne in like manner drains that portion of the central plain which stretches towards the primitive district of Donegal and the high lands of Tyrone on the north; and Loch Neagh collects the waters of the remainder by the Blackwater River on the north-east. The other principal lakes of Ireland lie within the basin of the Shannon, those of most consequence being merely expansions of that river. The water-power afforded by the different rivers and natural dams of Ireland is greater than in any equal extent of accessible country in Europe. The surface of all the lakes in Ireland is estimated at 215,252 statute acres, or 336 square miles.

Climate.—There is but a small portion of Ireland which is more than fifty miles distant from the sea-coast, and on three sides of the island the Atlantic Ocean extends uninterrupted: hence the climate is more moist and less liable to severe cold than in any of the neighbouring countries. On an average of five years ending with 1829 the annual quantity of rain which fell at Cork in the southern extremity of the island was 35 inches, and in a like calculation for Derry, at its northern extremity, the average annual quantity was 31 inches; being in both cases considerably above the average quantity for most parts of Great Britain, though much below the average at Kendal, Keswick, and a few other places. Frosts are rarely severe in Ireland, and snow does not lie so long as in England; neither are thunder-storms of so frequent occurrence or of so formidable a character. The extension of tillage has contributed in a considerable degree to lessen the extreme moisture complained of by early historians; and to the quantity of dark-coloured earth now annually turned up intelligent writers attribute a fact often remarked by old persons, that the winters have latterly become much milder. The prevalent winds are from the west and south, and these are usually accompanied by a mild state of the atmosphere. Easterly winds are keen, and much dreaded by invalids. Instances of longevity are numerous, and the population generally healthy.

The chief characteristics of the scenery of Ireland are freshness and verdure: the surface is less rugged than that of Scotland, and more varied and undulating than that of England; it is however generally deficient in timber. The works of various tourists have latterly attracted much attention to the natural beauties of the southern and western districts.

History and Antiquities.—In the various names of Ireland, as known to the classic writers, Iris, Iernis, Iuvernis, Hibernia, &c., the radical *Ir* or *Eri*, by which it is still known to its own natives, is plainly traceable. It is customary among the Irish to indicate a country by the affix *Hy* or *Hua*, sometimes written *O*, as in the case of proper names, signifying literally 'the (dwelling of the) sons or family of,' such as Hy-Mania, Hy-Tuirtre, Hy-Brazil, &c. In adding this affix to names beginning with a vowel it is optional to insert a consonant to prevent the concurrence of open sounds, thus *Hy-v-Each*, meaning the country of the descendants of Each or Æacus. Again, this affix requires the genitive, which in *Eri* is *Erin*, and thus all variations of the name, from the *Iris* of Diodorus Siculus, and the *Ir land* and *Ireland* of modern times, to the *Iernis* (*Hy-Ernis*) of the Orphic poems, and the *Hibernia* (*Hy-b-Ernia*) of Latin writers, would seem to be accounted for.

The name *Scotia* does not appear to have been applied to Ireland till about the end of the third century, from which time to the beginning of the eleventh it continued to indicate that country exclusively.

The Scoti, who were in possession of the island at the time of the introduction of Christianity, appear to have been to a great extent the successors of a people whose name and monuments indicate a close affinity with the Belgæ of Southern Britain. A people also called Cruithne by the Irish annalists, who are identifiable with the Picts of Northern Britain, continued to inhabit a portion of the island distinct from the Scoti until after the Christian mission; and it is observable that the names of mountains and remarkable places in that district still strikingly resemble the topographical nomenclature of those parts of North Britain which have not been affected by the Scotic conquest. The monuments and relics which attest the presence of a people considerably advanced in civilization at some period in Ireland, such as Cyclopean buildings, sepulchral mounds containing stone chambers, mines, bronze instruments and weapons of classic form and elegant workmanship, would appear to be referrible to some of the predecessors of the Scoti, and indicate a close affinity between the earliest inhabitants of Ireland and that antient people, by some referred to a Phœnician origin, whose vestiges of a similar kind abound throughout the south and south-west of Europe.

The Scoti were not builders in stone, at least in their civil edifices, nor did they use bronze implements. Their own tradition is that they came originally from Scythia, by which is meant the north-eastern part of central Europe, which appears to be confirmed by the fact that the antient topography of the country, in districts where the Scotic invasion has not wholly obliterated it, points at the Welsh language as the nearest representative of that spoken by the predecessors of the Scoti, and that the chief distinctions which at present exist between the Irish and Welsh languages are referrible to a Gothic or Northern European source.

The general conversion of the Irish Scots to Christianity took place in the earlier and middle portion of the fifth century. The principal instrument in effecting the change was Patrick, who landed in Ireland on this mission in the year 432. Before this time, Christianity had made some progress, but the mass of the people were heathens. The form of church government introduced by Patrick was episcopal: in his doctrine and that of his successors for many centuries it is affirmed that there are no traces of those peculiar tenets which the Reformed churches rejected in the sixteenth century.

A considerable advance in civilization followed the introduction of the new religion. Greek and Roman literature got some footing among the clergy, and an improved system of architecture became requisite for religious edifices. The Irish round towers are now generally ascribed to an ecclesiastical origin, and are supposed to have been erected during the sixth, seventh, and eight centuries, which form perhaps the most prosperous epoch in the history of the country. From the end of the eighth century till the coming of the English, in A.D. 1170, the disputes of the petty princes of the country, and the frequent depredations of the Danes and other northern pirates, render the annals of Ireland a melancholy series of feuds and disasters.

Up to this time the government of the island had usually been vested in one monarch, who was entitled to certain subsidies and services from the petty kings of the provinces, and they in like manner levied contributions from the minor chiefs of territories. Dermod Mac Murrough, king of Leinster, having seduced the wife of one of these petty princes, and otherwise grown oppressive to his subjects, was expelled from his dominions in 1168, and fled for succour to Henry II. king of England, who, having already obtained a grant of Ireland from pope Adrian IV., readily gave his countenance to the restoration of Mac Murrough on receiving his oath of allegiance; but, being at that time engaged in a war with the French, he was unable personally to undertake the expedition. Several Welsh adventurers however, having obtained his licence to embark in the undertaking, fitted out a small armament, with which they landed in the county of Wexford, in the month of May, A.D. 1170. The conquest of the entire island was soon effected. In 1174, the king, coming over in person, received the submission of the Irish monarch, and of almost all the provincial and petty kings, and in the same year had his title confirmed, and the discipline of the Irish and English churches assimilated at a general synod of the Irish clergy held at Cashel.

The country was now portioned out among the Anglo-Norman conquerors, and with the introduction of English modes of tenure the erection of courts of law and appointment of executive authorities had their commencement. The twelfth year of the reign of king John, who succeeded his father as lord of Ireland, is the epoch to which the final division into counties is generally referred. This division appears to have embraced almost the entire of Ireland, although through subsequent reverses most of the counties in Ulster and Connaught ceased to be considered shire ground. These disasters were chiefly owing to the exorbitant powers enjoyed within their several territories by the great lords of the country, who finding the Irish customs more congenial to arbitrary authority, by degrees fell away from the exercise of the English law, and assumed the characters of despotic chieftains. In particular, the family of the De Burgho's in Ulster and Connaught, being released, by the murder of William earl of Ulster, in A.D. 1333, from the restraint which he had for some time exercised over them, seized the better part of the latter province and assumed Irish names; while the northern native Irish recrossing the river Bann, beyond which they had hitherto been confined, drove the English out of the north-eastern parts of Ulster, and narrowed the pale in that direction to the county of Louth. In like manner the families of Desmond and Kildare, having possessed themselves of a great part of Munster and Leinster, introduced the Irish customs on that side, so that on the accession of king Henry VIII. there was but an inconsiderable tract along the eastern coast in which the English law was fully recognised.

In this and the succeeding reigns of Elizabeth and James I., the English government having now the double motive of effecting a religious as well as a civil reformation in Ireland, applied themselves with great energy to the recovery of their authority, and, after a tedious series of rebellions and confiscations, succeeded at length, in the beginning of the seventeenth century, in making the entire island shire-ground, and planting a numerous Protestant proprietary in Ulster. The Reformed church had already been established in A.D. 1535; but the great body of the native Irish still continued attached to the Roman Catholic faith.

In October, 1641, a rebellion, having for its object the overthrow of the new establishment and the restoration of the old proprietors to their estates, broke out among the native Irish, and was afterwards joined by the chief Roman Catholic nobility and gentry: the result of the civil wars which ensued was the suppression of the Irish and Roman Catholic party, and a general confiscation of their lands.

On the accession of James II., and the prospect of a re-establishment of the Roman Catholic church, the same party again rose to considerable power, and on king James retiring to Ireland after the revolution of 1688, they supported his cause through an arduous war of three years' continuance, until after the defeats of the Boyne and Aughrim, when they finally capitulated at Limerick, on the 3rd October, 1692. Extensive confiscations followed this civil war also. The military men and other more active members of the Roman Catholic party left the country, and entered into the service of different states on the Continent, where they very generally distinguished themselves by their fidelity and bravery. Those who remained, still constituting the bulk of the population of the island, were henceforth treated with extreme severity; yet, notwithstanding the harshness of the penal laws from time to time enacted against Roman Catholics, the country generally prospered during the century of uninterrupted tranquillity that ensued. The example of the American and French revolutions however having created a democratic spirit among many of the northern Protestants, and some of them having taken up arms in the year 1798, led to another rising among the Roman Catholic peasantry of much the same character with those insurrections in which their ancestors had unfortunately been so often engaged. This rebellion, being likewise suppressed, led the way to the Act of Union, by which the parliament of Ireland, which had of late years enjoyed an absolute independence of all power but the crown, was merged in that of the United Kingdom, A.D. 1800.

The Irish Roman Catholics, who had greatly increased in wealth and numbers since the time of the Union, were in the year 1829 admitted generally to the political privileges enjoyed by Protestant dissenters. The Reform Act considerably added to their political influence, and various changes are now in progress and operation, the general tendency of which is to give them a large share of political power in the state.

Population.—Notwithstanding the numerous colonies of British who have from time to time settled in Ireland, the great bulk of the population is still of the native Irish race. The native Irish are of a warm and imaginative disposition, with much natural eloquence and a strong perception of humour; they are very hospitable, and individually brave; the prevailing vices of the national character are improvidence and a disposition to riotous excitement. During the wars in the reign of Elizabeth they were reduced to considerably less than a million in number, but in the subsequent progress of the population they have increased in a much more rapid ratio than either their English or Scottish fellow-countrymen. The following table exhibits the numbers of the entire population at the several dates below:—

Date.	How ascertained.	
1672	By Sir William Petty . . .	1,320,000
1695	By Captain South	1,034,102
1712	By Mr. Dobbs. (See *Essay on Trade and Improvement of Ireland*, by him, published 1721; numbers taken from hearth-money returns.	2,099,094
1718		2,169,048
1725		2,317,374
1726		2,309,106
1731	By the Established Clergy, by order of the House of Lords of Ireland.	2,010,221
1754	From the returns of the hearth-money collectors . . .	2,372,634
1767	On an average of 6 per house .	2,544,276
1777	Ditto	2,690,556
1785	Ditto	2,845,932
1788	Mr. Bushe	4,040,000

Date.	How ascertained.	
1791	Hearth-money collectors	4,206,612
1792	Estimated by Dr. Beaufort	4,088,226
1805	Mr. Newenham's estimate	5,395,456
1821	Under Act 55 Geo. III., c. 120	6,801,827
1831	Under Act 1 Will. IV., c. 19	7,767,401
1834	Estimated by the Commissioners on Public Instruction	7,954,100
1837	Estimated by Irish Railway Commissioners	8,523,750

The distribution of this very large population is chiefly towards the eastern side of the island; the west and north-west are comparatively thinly inhabited. The general condition of the people is considerably improved of late years, but still there is a very numerous class of peasantry in the west and north-west whose state is extremely wretched. The average rate of wages for agricultural labourers throughout the entire country is about 8½d. per day, and the average employment about twenty-two weeks of six working days each in the year. The classes into which the population was divided in 1831 appear in the census of that year as follows:—Families chiefly employed in agriculture, 884,339; ditto chiefly employed in trade, manufactures, and handicraft, 249,369; ditto not comprised in the preceding classes, 251,368; males 3,794,880; females 3,972,521; total 7,767,401 persons, forming 1,385,066 families, inhabiting 1,249,816 houses.

In the same year the number of agricultural occupiers employing labourers was 95,339; of occupiers not employing labourers, 564,274; of male labourers employed in agriculture, 567,441; of males, 20 years of age, employed in manufactures, 25,746; employed in retail trade or in handicraft as masters or workmen, 298,838; of capitalists, bankers, professional and other educated men, 61,514; of labourers employed in labour not agricultural, 89,876; of other males 20 years of age, except servants, 110,595; of male servants 20 years of age, 54,142; of ditto under 20 years, 44,600; of female servants, 253,155.

Religion.—In 1834, according to the returns of the Commissioners of Public Instruction, there were in Ireland 6,431,008 Roman Catholics; 852,676 members of the Established church; 642,356 Presbyterians; 21,808 other Protestant dissenters: and 6254 whose religion could not be ascertained; being in the proportion of 4½ Roman Catholics nearly to one Protestant of whatever denomination.

Education.—In 1834 there were in Ireland 9657 daily schools, being in the proportion of one school to each 824 of the entire population, educating 633,946 young persons, being in the proportion of 7·97 per cent. of the entire population under daily instruction. Of these schools 5653 were supported wholly by payments from the children, and 4004 were supported wholly or in part by endowment or subscription: of the latter class there were in the above year 892 in connection with the National Board of Education; 203 in connection with the Society for Discountenancing Vice; 115 in connection with Erasmus Smith's fund; 235 in connection with the Kildare-street Society, and 618 in connection with the London Hibernian Society. There is a University at Dublin, a Roman Catholic College at Maynooth, and various superior establishments for education in other towns. [Belfast; Dublin; &c.]

Crime.—During the year 1836 there were 23,891 persons committed for trial or bailed, of whom 7769 were charged with offences against the person; 671 with offences against property committed with violence; 6593 with offences against property committed without violence; 500 with malicious offences against property; 214 with forgery and offences against the currency; and 8144 with other offences not included in the above classes. The proportion of the offenders to the entire population was 1 in 325, and the male offenders were to the female as 0·82 to 0·18. Of the total number of offenders 6744 males and 490 females could read and write; 3898 males and 912 females could read only; 7435 males and 2595 females could neither read nor write; and of 1542 males and 275 females the instruction could not be ascertained. The total number of convictions in that year was 18,110.

Productive Economy.—*Agriculture.*—The agricultural produce of Ireland was estimated, in the year 1832, at 36,000,000*l.* per annum, raised off 14,603,473 acres. This falls short, by nearly one half, of the amount of produce yielded by an equal area in Great Britain; and yet in the latter country there are only *two* agricultural labourers for every *five* for the same quantity of land in Ireland. Hence it appears that the productive powers of the soil of Ireland, as compared with those of the soil of Great Britain, are little more than half developed. The causes of this deficiency are to be sought in a bad system of agriculture, small farms, and want of capital. A marked improvement is however observable both in the quantity and quality of Irish agricultural produce within the last ten years. The increase in quantity will be apparent from the following table of the comparative exports of some of the principal articles of such produce in the years 1825 and 1835:—

Exports of Irish Produce in 1825 *and* 1835.

Commodities.	Quantity.		Increase between these Periods.	Estimated Value for 1835.	
	1825	1835.		£	s
Cows and Oxen, number	63,524	98,150	34,626	793,837	0
Horses . . . do.	3,140	4,655	1,515	65,153	0
Sheep . . . do.	72,191	125,452	53,261	199,986	0
Swine . . . do	65,919	376,191	310,272	893,839	0
Grain, viz.: Wheat, qrs.	283,340	420,522	137,182	812,111	0
„ Barley, do	154,822	168,946	14,124	210,756	0
„ Oats, do.	1,503,204	1,575,984	72,780	1,661,953	3
„ Other Grain	23,832	39,637	15,805	75,149	6
Wheatmeal, Flour, and Oatmeal . . cwts.	591,124	1,981,480	1,390,356	1,441,965	0
Potatoes . . . do.	..	223,398	..	17,557	0
Provisions: Bacon and Hams do.	362,278	379,111	16,833	828,158	0
„ Beef and Pork do.	604,253	370,172	..	723,935	0
„ Butter do.	471,161	827,009	352,848	3,316,806	0
„ Lard . do.	35,261	70,267	35,006	182,013	0
Eggs { number	..	52,244,800	..	87,352	0
Eggs { crates	..	2,275	..	37,660	0
Eggs { boxes	..	10,695	..	31,027	0
Feathers . . . cwts.	..	6,432	..	32,636	0
Hides and Calf Skins, number	..	57,657	..	45,831	0
Wool, Sheep and Lambs' { bales	..	33	..	1,240	0
Wool, Sheep and Lambs' { lbs.	..	761,184	..	17,322	16
Flax and Tow . cwts.	54,898	163,949	109,051	402,773	10
Spirits . . . gallons	629,529	459,473	decrease.	75,505	0
Beer . . . do.	..	2,686,688	..	138,981	0

The earnings of the agricultural labouring classes, including occupiers labouring on their own land, in 1836, are estimated at 6,844,500*l.*

The value of the peat annually raised from the bogs for fuel is very considerable. At 35 kishes or loads per family, which is the estimate of Mr. Wakefield, averaging 9*d.* per kish, the value of the quantity required for fuel in 1831, calculating only on the families employed in agriculture, would be 1,160,694*l.*; but this is probably too low an estimate, as it only exceeds by about 200,000*l.* the value of the imported and native coal consumed in the same time.

Mining.—The annual average produce of the mines worked by the Mining Company of Ireland in 1836 was about 150,000*l.*, and of the mines worked by other parties about 220,000*l.* The export of lead and copper ore in 1835 amounted to 477,660 cwts., of an estimated value of 179,388*l.* The mines and quarries at present open are not however worked to their full extent; this branch of industry is indeed still in its infancy in Ireland.

Fisheries.—In the general coast fishery in the year 1836 there were employed—decked vessels 215, tonnage 7099 tons; half-decked ditto 870, tonnage 10,292 tons; open sail-boats 1812, tonnage 9178 tons; and row-boats 7864 total number of fishermen 54,119; showing a considerable decrease since 1830, when the number of fishermen employed was 64,771. The earnings of each fisherman having a share in the produce being estimated at from 3*s.* 6*d.* to 4*s.* per week on an average through the year would give the nett profits of the produce for 1836 at 527,650*l.* The gross annual produce of the coast and river salmon fisheries does not amount in all to 10,000*l.*

Manufactures.—The value of the unbleached linens sold in the several counties of Ulster in the year 1824 was 2,109,305*l.*, and in all Ireland for the same year 2,580,697*l.* Since that time there is no authentic return; but the introduction of linen-yarn spinning-machinery has latterly given the linen trade an extraordinary impetus in the northern counties of Ulster. The exports of linen in the year 1835 amounted to 70,209,572 yards, of an estimated value of 3,725,054*l.*, being an increase on the linen export of 1825 of 15,095,057 yards.

The cotton trade is carried on to a considerable extent in

the same district, and in one large establishment in the county of Waterford; but it has latterly declined, and many of the mills originally designed for the spinning of cotton are now turned to the manufacture of linen yarn, the demand for which is much greater than the present means of production can meet. The export of cotton fabrics, which in 1825 amounted to 10,567,458 yards, in 1835 was only 1,039,088 yards, estimated at a value of 15,253*l*. In the latter year there was however an export of cotton in other forms of manufacture to the amount of 132,880*l*.

Since the year 1822 the woollen trade has declined considerably. In that year there were in and about Dublin forty-five establishments, the annual value of the goods produced in which, if estimated at present prices, would be about 200,000*l*. The total value of the woollens now manufactured in the same district is about 90,000*l*. In the districts of Cork, Kilkenny, Moate, and Carrick-on-Suir, where the woollen trade formerly flourished, the present value of the woollens annually manufactured does not exceed 20,000*l*.; and the flannel trade of Wicklow and Wexford, which in 1822 was estimated at 56,000*l*. for the annual value of its produce, may now be considered as extinct. The manufacture of worsted and stuff articles is the only branch of this trade which has increased within the last sixteen years: it is now carried on to a considerable extent at Mount Mellick and Abbeyleix in the Queen's County. Such of the general trade as remains is however considered to be at present in a healthy state, and reasonable hopes are entertained of a progressive improvement. The value of the different woollen manufactures exported in 1835 was 40,128*l*.: a considerable portion of this export was to the south of England, which is now more accessible to the Irish than to the northern English manufacturer. The silk manufacture is also much decayed: the export of silk fabrics in 1835 amounted to 21,740*l*.

In grinding, malting, brewing, and distilling, a great advance has been made in Ireland within the last fifteen years The number of corn mills in Ireland in 1835 was 1882; of corn-kilns, 2296: of distilleries, 95; of rectifying distilleries, 19; of breweries, 236; of paper manufactories, 57, of glass-works, 6; and of tobacco factories, 291. The export of oatmeal, flour, and wheatmeal, which now amounts to nearly one million and a half sterling annually, has grown up almost wholly of late years; so also the valuable export trade in porter.

Steam Power.—There were, in 1835, 151 steam-engines of from 1 to 100 horse-power each, employed in various manufacturing operations in the towns and neighbourhoods of Belfast, Clonmel, Cork, Dublin, Galway, Kilkenny, Limerick. Londonderry, Waterford, and Portlaw. Of these the first was erected in Belfast in the year 1806.

In addition to these there are upwards of 90 steam-vessels with engines of from 20 to 300 horse-power engaged in the British coast and canal traffic. Cork is now a station for steamers sailing to North America, and a steam communication is kept up during the summer months between Bordeaux and Dublin, and Hâvre and Belfast.

COMMERCE.—*Inland Traffic.*—The inland traffic of Ireland is almost wholly carried on either by high road or canal, there being but one railway of five miles in length at present in operation in the country. Another line of seven miles in length is however now in process of completion between Belfast and Lisburn. The extent of the various lines of inland navigation is as follows:—

	Miles.
Grand canal from Dublin to Ballinasloe, with its branches	164
Royal canal from Dublin to Tarmonbarry, with its branches	99
Lower Shannon navigation	44
Limerick navigation, river and canal	15
Middle Shannon, navigation	3[illegible]
Upper Shannon navigation	59
Lagan navigation, river and canal	28¼
Newry navigation, river and canal	16½
Tyrone navigation, river and canal	11¾
Lower Boyne navigation, river and canal	19
Slaney navigation, river and canal	16
Barrow navigation, river and canal	78
	589½
In addition there is now in progress the Ulster canal, joining the waters of Lough Neagh and and Lough Erne, of which there are completed	24
	613½

Being in all about one-fourth of the similar means of internal traffic existing in 1835 in an equal area in Great Britain.

The general direction of the traffic of Ireland is eastward, of the external traffic almost wholly so. With the exception of the transverse lines of the Royal and Grand Canal, the great bulk of the inland traffic lies towards and along the eastern coast from Londonderry to Cork inclusive.

Carrying Traffic.—The means of external traffic possessed by Ireland amount to less than one-fourteenth of those of England, and to rather more than a third of those of Scotland. The following table exhibits the number of vessels, with the amount of their tonnage, and the number of men and boys usually employed in navigating the same that belonged to the several ports of Ireland in the years below:—

	Vessels.	Tonnage.	Men.
On the 31st December, 1834	1536	119,398	8731
„ „ 1835	1627	131,735	9282
„ „ 1836	1635	128,469	9189

Here the proportion of seamen to tonnage is about 1 to 14; in the merchant-service of England the proportion is as 1 to 18 nearly This difference is to be accounted for by the superior size and better management of the English vessels, which require less manual labour. The general navigation of Ireland and its progress appear from the subjoined table, showing the number of vessels, with the amount of their tonnage and men (including their repeated voyages), that entered inwards and cleared outwards at the several ports of Ireland, from and to all parts of the world, during each of the years below:—

Shipping entered inwards in Ireland, from all parts of the World.

Year ending 5th January.	British and Irish Vessels.			Foreign Vessels.			Total.		
	Vessels.	Tons.	Men.	Vessels.	Tons.	Men.	Vessels.	Tons.	Men.
1835	15,691	1,621,410	94,706	139	22,188	1192	15,830	1,643,598	95,898
1836	15,418	1,621,603	97,164	163	26,274	1366	15,581	1,647,877	98,530
1837	15,565	1,662,264	102,324	149	21,714	1228	15,714	1,683,978	103,552

Shipping cleared outwards from Ireland, to all parts of the World.

Years ending 5th January.	British and Irish Vessels.			Foreign Vessels.			Total.		
	Vessels.	Tons.	Men.	Vessels.	Tons.	Men.	Vessels.	Tons.	Men.
1835	10,354	1,180,135	71,900	100	16,386	881	10,454	1,196,521	72,781
1836	10,254	1,210,327	76,842	131	21,748	1120	10,385	1,232,075	77,962
1837	10,148	1,251,835	80,289	128	19,029	1052	10,276	1,270,864	81,341

Imports and Exports.—Summary of the Imports and Exports of Ireland for the year 1835, *including the coasting trade.*

Names of Ports.	Counties.	Exports, 1835. Value.			Imports, 1835. Value.		
		£	s.	d.	£	s.	d.
Ardglass and Killough	Down	35,161	0	0	2,970	0	0
Arklow	Wicklow	3,677	0	0	6,762	10	0
Balbriggan	Dublin	5,417	10	0	11,391	19	2
Ballina	Sligo and Mayo	70,568	0	0	13,532	0	0
Ballyrane Creek	Donegal	20,834	0	0	5,770	0	0
Ballycastle Creek	Antrim	1,791	0	0	2,030	13	3
Ballyshannon	Donegal	11,130	0	0	9,524	0	0
Baltimore, &c.	Cork	37,144	0	0	17,767	0	0
Bantry Creek	Do.	6,212	0	0	17,293	8	0
Berehaven Creek	Do	77,362	0	0	30,081	0	0
Belmullet Creek	Mayo	2,940	0	0	———		
Belfast	Antrim	4,341,794	3	7	3,695,437	11	10
Clare Creek	Clare	16,617	0	0	1,672	0	0
Coleraine and Portrush	Derry and Antrim	105,685	0	0	65,900	0	0
Cork	Cork	2,909,864	0	0	2,751,684	0	0
Donaghedee Creek	Down	62,484	0	0	7,570	0	0
Donegal Creek	Donegal	11,363	0	0	11,331	0	0
Drogheda	Cy. of town	766,027	0	0	259,854	0	0
Dublin	Dublin	2,528,543	0	0	4,430,321	0	0
Dundalk	Lowth	452,813	0	0	107,953	0	0
Dungarvan	Waterford	69,486	0	0	16,312	15	0
Galway	Galway	251,864	0	0	88,268	12	8
Killalla	Mayo	26,396	0	0	3,188	0	0
Kilrush	Clare	36,158	0	0	2,768	0	0
Kinsale Creek	Cork	13,479	0	0	18,262	0	0
Larne Creek	Antrim	60,309	0	0	7,255	6	7
Limerick	Limerick	726,430	0	0	323,740	0	0
Londonderry	Londonderry	1,040,918	0	0	708,054	0	0
Newcastle Creek	Down	3,681	0	0	3,156	0	0
Newport Creek	Mayo	2,269	0	0	———		
Newry	Down and Armagh	616,836	0	0	568,711	0	0
Ross	Wexford	59,074	0	0	28,007	0	0
Strangford	Down	79,633	6	4	20,498	8	0
Sligo	Sligo	369,490	0	0	121,692	0	0
Tralee	Kerry	42,315	0	0	7,270	0	0
Waterford	Waterford	1,821,245	0	0	1,274,154	0	0
Wexford	Wexford	312,136	0	0	621,417	0	0
Westport	Mayo	87,805	0	0	28,517	0	0
Wicklow	Wicklow	86,565	18	0	15,671	0	0
Youghall	Cork	215,316	0	0	28,310	0	0
Total		17,394,813	7	11	15,337,097	4	6

Exclusive of the coasting trade, so as to exhibit the true excess of exports over imports, these totals for the year 1835 are—

	£	s.	d.
Exports	£16,693,685	6	1
Imports	10,918,459	4	4
Excess of Exports over Imports	5,775,226	1	9

The increase exhibited by the returns of this year over those of 1825 is very remarkable, showing an increased value on exports of 7,450,475*l.* 6*s.* 1*d.*, and on imports of 2,321,674*l.* 4*s.* 4*d.*

The principal article of import into Ireland is cotton goods, which in 1835 were imported to the amount of 1,419,364*l.*; in the same year, notwithstanding the active manufacture of linen yarn in Ulster, that article was imported to the amount of 1,217,900*l.* The next most important articles of import in that year were—tea, to the amount of 972,554*l.* 11*s.* 8*d.*; coal, 802,749*l.* 5*s.* 2*d.*; sugar, 774,930*l.*; tobacco, 743,115*l.* 7*s.* 10*d.*; woollen goods, 685,423*l*; haberdashery and apparel, 487,630*l.*; wool, 304,337*l.*; iron, 208,830*l.*; cast-iron, 89,130*l.*; wrought-iron and hardwares, 198,806*l.*; glass and earthenware, 128,709*l.*; wines 160,343*l.* 1*s.* 3*d.*; herrings, 124,084*l.*; hides, 163,221*l.*; tallow, 129,149*l.*; hops, 92,657*l.*; flax-seed, 84,329*l.*; salt, 65,718*l.* 14*s.*; leather, 30,840*l.*, &c.

Currency.—There are in Ireland seventeen banks and banking companies, with numerous branch establishments: the following is an estimate of the proportions in which their notes circulate in each of the four provinces, the total amount of notes being about 5,000,000*l*—

The province of Leinster	£1,700,000
" Ulster	1,400,000
" Munster	1,300,000
" Connaught	600,000
	£5,000,000

Between the years 1824 and 1831 there appears to have been an amount of government stock of the value of 14,181,100*l.* transferred to the credit of Irish fundholders.

GOVERNMENT.—*Representation.*—Ireland is represented in the imperial parliament by 105 members of the House of Commons, and 28 temporal and 4 spiritual peers in the House of Lords. The temporal peers are elective representatives for life; the spiritual peers take the office in rotation.

Civil Divisions.—Ireland is divided into four provinces and thirty-two counties. *Connaught* contains 5 counties, *Munster* 6 counties, *Ulster* 9 counties, and *Leinster* 12 counties. The counties are divided into baronies, and the baronies into townlands.

The following is a list of the counties of Ireland, with the population according to the last census, and the area in square miles:—

	Population.	Sq. Miles.
Antrim (Ulster)	325,615	1,107
Armagh (Ulster)	220,135	485
Carlow (Leinster)	81,988	330
Cavan (Ulster)	227,933	711
Clare (Munster)	258,320	1,141
Cork (Munster)	810,732	2,659
Donegal (Ulster)	289,150	1,829
Down (Ulster)	352,010	951
Dublin (Leinster)	380,167	294
Fermanagh (Ulster)	149,763	640
Galway (Connaught)	414,684	2,033
Kerry (Munster)	263,126	1,670
Kildare (Leinster)	108,424	597
Kilkenny (Leinster)	193,685	733
King's County (Leinster)	144,225	714
Leitrim (Connaught)	141,524	576
Limerick (Munster)	315,355	750
Londonderry (Ulster)	222,010	794
Longford (Leinster)	112,558	357
Louth (Leinster)	124,846	322
Mayo (Connaught)	366,328	1,599
Meath (Leinster)	176,826	899
Meath, West (Leinster)	142,280	578
Monaghan (Ulster)	195,536	493
Queen's County (Leinster)	145,850	741
Roscommon (Connaught)	244,207	870
Sligo (Connaught)	171,765	638
Tipperary (Munster)	402,564	1,305
Tyrone (Ulster)	304,168	1,210
Waterford (Munster)	177,055	618
Wexford (Leinster)	182,713	627
Wicklow (Leinster)	121,558	607
	7,767,400	28,881

	Sq. Miles.	Population.
Ulster	8,220	2,286,620
Leinster	6,802	1,915,120
Munster	8,143	2,227,152
Connaught	5,716	1,338,508
	28,881	7,767,400

Each of the 32 counties returns 2 members to the House of Commons, and the University of Dublin 2 members.

List of the cities and boroughs which return members to the House of Commons:—

			14		28
Armagh	1	Dublin	2	Londonderry	1
Athlone	1	Dundalk	1	Mallow	1
Bandon	1	Dungannon	1	New Ross	1
Belfast	2	Dungarvan	1	Newry	1
Carlow	1	Ennis	1	Portarlington	1
Carrickfergus	1	Enniskillen	1	Sligo	1
Cashel	1	Galway	2	Tralee	1
Clonmel	1	Kilkenny	1	Waterford	2
Coleraine	1	Kinsale	1	Wexford	1
Cork	2	Limerick	2	Youghall	1
Downpatrick	1	Lisburn	1		
Drogheda	1				
	14		28		39

In the Population Returns the number of parishes in each county is not stated; but it appears from some Diocesan Returns made in 1834 that the total number of parishes in the four provinces is 2348; that is, for the province of Armagh, 658; Dublin, 624; Cashel, 791; and Tuam, 275.

Ecclesiastical Divisions.—Ireland is divided into four ecclesiastical provinces and thirty-two dioceses. These di-

visions, although equal in number and corresponding in general situation, are in no instance co-extensive with the civil districts. The provinces are ARMAGH on the north, containing the dioceses of *Clogher, Kilmore, Ardagh, Meath, Armagh, *Dromore, Down, Connor, Derry, *Raphoe; TUAM on the west, containing the dioceses of *Kilmacduagh, *Clonfert, *Elphin, Tuam, *Killalla, *Achonry; DUBLIN on the east, containing the dioceses of *Kildare, Leighlin, Dublin, Ferns, *Ossory; and CASHEL on the south, containing the dioceses of *Waterford, *Lismore, Cashel, Emly, Cloyne, *Cork, *Ross, Ardfert and Aghadoe, Limerick, Killaloe, Kilfenora. The dioceses are divided into parishes, which are for the most part co-extensive with a certain aggregate of townlands. By the 3rd & 4th William IV., c. 37, it is enacted that the dioceses marked above with asterisks, forming in all ten bishoprics, when and as void, shall be united to certain other bishoprics: by the same act the archiepiscopal sees of Tuam and Cashel, on becoming void, are to be united to the archiepiscopal sees of Armagh and Dublin respectively. The present ecclesiastical establishment consists of four archbishops and twelve bishops, six of the bishoprics mentioned in the act having now lapsed.

The Roman Catholic establishment consists of four archbishops and twenty-three bishops, their provinces and dioceses being for the most part co-extensive with those of the Established church.

The Presbyterian body are divided into two sects; one, by much the more numerous, being in connection with the synod of Ulster, which agrees in doctrine and government with the church of Scotland; and the other with the synod of Munster and Remonstrant synod, among whom Unitarian opinions are prevalent. The Seceding body have also their synod.

The clergy of the Established church derive their revenue from church lands and tithes; those of the Presbyterian church from parochial stipends and an annual grant from government, called the *regium donum*; the Roman Catholic church is supported wholly by dues paid by the people.

Justice.—The law courts of Ireland are the Queen's Bench, Common Pleas, Exchequer, and Chancery. There is also, as in England, a bankrupt court, a court for the relief of insolvent debtors, a court of admiralty, with consistorial courts in the several dioceses, and a metropolitan ecclesiastical court. There are four judges in each of the courts of Queen's Bench, Common Pleas, and Exchequer. In the Court of Chancery there are the lord-chancellor and the master of the rolls. The office of vice-chancellor does not exist in Ireland. The courts of law sit during each term in Dublin, and the going judges hold assizes of Oyer and Terminer and gaol delivery twice a year in each county town. Courts of quarter-session are held in the several counties before assistant-barristers, and there are numerous minor courts in most of the towns and counties.

Executive.—The administration of the government is vested in the lord-lieutenant and privy-council, assisted by a chief secretary and an attorney and solicitor-general. The lord-lieutenants and magistrates of the several counties are appointed by the crown and lord-chancellor, and the sheriffs are generally nominated by the going judges and appointed by the lord-lieutenant.

The police, independent of the local police of the towns, in 1836, consisted of 4 inspectors, 1 superintendent, 10 resident magistrates, 155 chief constables of the first and 59 of the second class; 1232 constables; 6233 subconstables, and 277 horse of the constabulary force; and of 10 resident magistrates, 9 chief constables, 109 constables, 492 subconstables, and 10 horse of the peace preservation police: total expense of both forces, 382,460*l.* 12*s.* 11*d.*

In addition to this force there are generally from 15,000 to 20,000 soldiers of the line quartered in Ireland.

Finance.—The revenue of Ireland is derived from four sources; customs, excise, postage, and stamps. The following table exhibits a comparative view of the progress of this branch of the general revenue from the year preceding the Union.—Gross proceeds:

	1799			1810			1820			1837		
Customs	832,046	17	7	2,044,430	14	11	1,885,482	17	1½	2,036,738	2	3½
Excise	635,666	4	3	1,824,921	4	7½	2,295,377	19	4½	2,027,949	17	7¼
Post-Office	47,449	19	3	191,279	10	7	201,637	2	6¼	255,070	0	4
Stamps	56,902	17	7½	644,855	2	4½	448,088	14	2½	476,152	18	8¼
Fees and Imprest Monies										11,491	2	3
Total (gross)	£1,572,065	18	8½	£4,705,486	12	6	£4,830,586	13	2¾	£4,807,402	1	3

The rate per cent. for which these gross receipts have been collected has been greatly diminished of late years. In 1837 it was 11*l.* 13*s.* 4¾*d.*, including the expenses of the post-office department. The net proceeds in that year were 4,165,910*l.* 17*s.* 5¾*d.*

The general contribution of Ireland to the imperial revenue is however considerably greater than the amount appearing on these returns, in consequence of the large importation into that country of taxable commodities which have already paid duty in Great Britain.

County Cess.—The cost of making, repairing, and maintaining highways, bridges, gaols, &c., and keeping up the general machinery for the administration of justice and preservation of the public health, is supported by local assessments levied by the grand juries of the several counties. These annual assessments average about 800,000*l.* for the whole country.

A good account of all the sources from which information in Irish affairs might be drawn up to the year 1724 is given in Nicholson's 'Irish Historical Library,' 8vo., Dublin, 1724. Since that time various general histories have been published by Leland, O'Halloran, MacGeoghegan, Plowden, Moore, and others, with statistical accounts of most of the counties by compilers employed by the Royal Dublin Society. The 'Transactions of the Royal Irish Academy' have latterly thrown much light on the antiquities and natural history of the country, and numerous Parliamentary Reports and Papers have from time to time added to our statistical information. A geological Map and Memoir, recently published by the Commissioners on Railways, have also supplied a desideratum long felt by writers on Irish topography. The more particular authorities are given under the heads of the several counties.

IRELAND, NEW. [NEW IRELAND.]

IRE'NA. [ORIOLINÆ.]

IRENÆUS, SAINT, bishop of Lyon in Gaul, was a pupil of Polycarp, in Asia Minor (Iren. *adv. Her.* iii. 3, § 4; Eusebius, *Hist. Eccl.* v. 20), and a presbyter of Pothinus, bishop of Lyon. He carried a letter from the church of Lyon to Eleutherus, bishop of Rome, respecting some disputes which existed between them, in which he is honourably mentioned. On the martyrdom of Pothinus, at the age of ninety, in 177 A.D., Irenæus was elected bishop of Lyon. He discharged the duties of his office with exemplary diligence and faithfulness, and is said to have been the means of converting many pagans to the Christian religion. The place of his birth is not known; but it is probable from his name that he was a Greek, and from his early acquaintance with Polycarp that he was a native of Asia Minor. Critics differ considerably respecting the date of his birth: Dodwell places it about A.D. 97, Grabe about A.D. 108, Du Pin about A.D. 140, and Tillemont about A.D. 120. It is commonly supposed that he suffered martyrdom in the beginning of the third century; but it has been argued by many critics, from the silence of Tertullian, Eusebius, and most of the early fathers, that this is probably incorrect.

With respect to the works of Irenæus, we learn from Eusebius (*Hist. Eccl.* v. 20) 'that he wrote several letters against those which at Rome corrupted the true doctrine of the church; one to Blastus, concerning schism; another to Florinus, concerning the monarchy, or that God is not the

author of evil; and concerning the number eight.' Eusebius also mentions (v. 26) 'a discourse of Irenæus against the Gentiles, entitled, Concerning Knowledge; another, inscribed to a brother named Marcianus, being a demonstration of the apostolical preaching; and a little book of divers disputations.' Irenæus also wrote a letter to Victor, bishop of Rome, concerning the controversy about the time of holding Easter; and also 'Five Books against Heresies.' The last work is still extant; but all the rest have perished, with the exception of a few fragments. The original Greek of the 'Five Books against Heresies' has also been lost; we possess only a Latin translation of it, written in an uncouth style, which was made, according to Dodwell's computation (*Dissert. Iren.* v. 9, 10), about A.D. 385. This circumstance renders the work of little value in ascertaining the readings of the Greek Testament in the time of Irenæus, since the Latin translator appears to have quoted the text of Scripture according to the Latin version then in use.

It is difficult to determine at what period the 'Five Books against Heresies' were written, but they all appear to have been composed after Irenæus became bishop of Lyon, and to have been published at different times. Irenæus was well acquainted with heathen literature and the doctrines of the heretics of his time. His work is very valuable in an historical point of view, and has been highly commended by most of the fathers; though Photius (*Bibl.* c. 120) gives rather a different opinion of it, thinking 'that the purity of the faith with respect to ecclesiastical doctrines is adulterated by the false and spurious reasonings of Irenæus.'

Irenæus was a most diligent collector of apostolical traditions. He informs us, in many parts of his work, that he was well acquainted with several persons who had been intimate with the apostles. Many of his traditions are of a very curious kind. He affirms that Christ was at least 50 years old at the time of his crucifixion, and he asserts the most extravagant opinions with regard to the Millennium. Middleton, in his 'Free Inquiry' (p. 45-52), has given an interesting account of many of the opinions of this father.

The life of Irenæus has been written by Gervaise, Paris, 1723. His works have been published by Erasmus, 1526; by Feuardent, 1596; by Grabe, 1702; by Massuet, 1710; and by Pfaff, 1734. Some of the fragments published for the first time by Pfaff are supposed by Lardner (*Credibility of the Gospel History*, Works, ii., p. 189-191, ed. of 1831) to be spurious.

IRETON, HENRY, the eldest son of German Ireton, of Attenton, in Nottinghamshire, was born in 1610. He was entered at Trinity College, Oxford, in 1626, and having taken the degree of bachelor of arts, became a student of the Middle Temple. His legal studies were interrupted by the outbreak of the civil war; he entered the parliamentary army, and soon made such a proficiency in the military art, that it has been asserted that Oliver Cromwell learned its rudiments from him. In 1646 he married Bridget, Cromwell's eldest daughter, by which connexion and his own merit he gained a commission, first of captain of horse, and almost immediately afterwards that of colonel. He distinguished himself in the battle of Naseby, was taken prisoner by the royalists, but made his escape. Ireton was perhaps more than any other man the cause of king Charles's death; by intercepting a letter, he is said to have discovered that it was the king's intention to destroy him and Cromwell, and from that time he rejected any accommodation: he attended most of the sittings of the regicide court, and signed the warrant for Charles's execution. On the establishment of the Commonwealth he was appointed to go to Ireland, next in command to Cromwell. He was made president of Munster, and afterwards lord-deputy of Ireland. The greater part of the country submitted to him from fear of his cruelty, without striking a blow. While in the height of his successes he was seized, before Limerick, with the plague, of which he died on the 15th of November, 1651. His body was landed at Bristol, and lay in state at Somerset House. On an atchievement over the gate of Somerset House was the motto, 'Dulce et decorum est pro patria mori,' which was readily translated 'It is good for his country that he is dead.' He was buried in Henry the Seventh's chapel in Westminster Abbey; but the corpse was exhumed after the Restoration, gibbeted, and burnt at Tyburn.

He left one son, Henry, and four daughters. Ireton was revered by the republicans as a soldier, a statesman, and a saint. He was called the 'scribe,' from his skill in drawing up declarations, petitions, and ordinances. His antagonists allowed him to be an able but not a virtuous statesman; indeed, he appears to have been the most artful, designing, and deliberate man of his party. He refused a grant of 2000*l.* a year, which was offered to him out of the confiscated estate of the duke of Buckingham; and after his death the parliament, out of gratitude for his services, settled it upon his widow and children. (Noble's *Memoirs of the Cromwell Family*, vol. ii., No. 27.)

IRIARTE. [YRIARTE.]

IRIDA'CEÆ, a natural order of endogenous plants, usually with equitant leaves, and a rhizoma or cormus for their stem, but more particularly characterized by having three stamens, the anthers of which are turned outwards, and an inferior ovary. The genera are numerous, and some not well defined; they inhabit the temperate parts of the world in preference to the hottest, where they are comparatively rare. The Iris and Crocus are representatives of the predominant northern form of the order, as Gladiolus and Ixia are of the genera prevalent in the southern hemisphere. All the species are sufficiently ornamental to deserve cultivation, and many are of striking beauty.



Leaves and flowers of Sisyrinchium striatum. 1, the stamens; 2, the ripe fruit.

IRIDI'NA. [CONCHACEA, vol. vii., p. 426.]

IRI'DIUM, a metal discovered in 1803 by Mr. Tennant (*Phil. Trans.*, 1804), and also about the same time by Descotils in France. Its name was suggested from *Iris*, the rainbow, on account of the various colours assumed by the solution obtained with hydrochloric acid. When the grains of native platinum are digested in nascent chlorine (aqua regia), a black powder is left after the platinum has been dissolved, which consists chiefly of iridium and another peculiar metal, osmium [OSMIUM]; some ore of titanium and chromate of iron also occur in it. The iridium is obtained by fusing this black residue for at least an hour with twice its weight of hydrate of potash in a silver crucible; the residual matter is to be washed to remove the oxide of osmium, and the insoluble portion remaining is iridium, which has been oxidized during fusion, mixed with any insoluble impurity. This is to be digested in hydrochloric acid, and if free from iron the solution is blue; but it afterwards becomes of an olive green, and eventually it acquires a deep red tint.

When a plate of zinc is immersed in this solution of the chloride of iridium, or when it is decomposed by a very high heat, the metal is obtained of a whitish colour, and its specific gravity, as determined by Mr. Children, who fused it by his large voltaic apparatus, is above 18, while that of the native iridium found in minute grains in the Siberian platinum, according to Breithaupt, is 23·35. It is brittle, and when carefully polished has the appearance of platinum. When heated to redness in the air, if in a state of fine division (which is obtained by precipitation), it is oxidized, but not if in mass.

One of the most remarkable characters of iridium is the difficulty with which it is acted upon by acids. It is even questionable whether they act at all upon the perfectly pure metal; but when alloyed with platinum nascent chlorine dissolves a small portion of it.

Oxygen and Iridium combine and form several oxides: the protoxide, sesquioxide, and teroxide. They are precipitated by the alkalis from the corresponding chlorides, obtained as we shall presently state.

The protoxide of iridium is black, and greenish-grey when combined with water so as to form a hydrate. It is composed nearly of 1 equivalent of oxygen 8, and 1 equivalent of iridium 98, making 106.

The sesquioxide is also black, but its hydrate is deep brown. It is not decomposed by a low red heat, but at the temperature of melting silver it loses all its oxygen. When slightly heated with charcoal, sulphur, or phosphorus, it detonates violently: acids do not act upon it, but, on the contrary, it unites with salifiable bases. It is of course composed of about 1½ equivalent of oxygen 12, and 1 equivalent of iridium 98, making 110.

The teroxide of iridium is yellowish-brown, or greenish in the state of hydrate. The oxide, which gives a blue-coloured solution with hydrochloric acid, is suspected by Berzelius to be a compound of the sesquioxide and peroxide. It is obtained by adding ammonia to a solution of bichloride of iridium, and digesting the mixture with a gentle heat till the greater part of the ammonia is volatilized. It is then precipitated, combined with a little ammonia.

The binoxide has not been hitherto insulated. This great variety of oxides, and the facility with which they appear to pass from one into the other, account for the variety of tints which their solutions exhibit.

Chlorine and Iridium.—The protochloride of iridium is obtained by transmitting chlorine gas over pulverulent iridium heated to incipient redness: at a full red heat the chlorine is expelled. It is insoluble in water, and sparingly dissolved by acids or nascent chlorine; but when the hydrated protoxide is digested in hydrochloric acid a solution is obtained which appears to be the protochloride dissolved in hydrochloric acid.

It is composed of 1 equivalent of chlorine 36, and 1 equivalent of iridium 98, making 134.

Sesquichloride of iridium may be obtained by calcining iridium with nitre, digesting the product in nitric acid, and, after washing, by dissolving it in hydrochloric acid. This chloride has so dark a yellowish-brown tint, that a small quantity renders water opaque. It yields by evaporation a dark-coloured, uncrystallizable, deliquescent mass. It consists of 1½ equivalent of chlorine 54, and 1 equivalent of iridium 98, making 152.

Bichloride of iridium is formed by heating the sesquichloride in nascent chlorine. Like the preceding, it yields by evaporation a dark-coloured deliquescent mass, which at 104° loses chlorine and returns to the state of sesquichloride.

The terchloride of iridium has not been obtained in a separate state. It is of a rose-red tint.

Iridium combines with carbon when a piece of this metal is held in the flame of a spirit lamp. The resulting compound consists of about 19·8 of carbon, and 80·2 of iridium.

No other compounds of iridium are much known: it has however been inferred, from the colour of the precipitates formed by the addition of hydrosulphuric acid to the preceding chlorides, that there are corresponding sulphurets.

IRIS. [EYE; RAINBOW.]

IRITIS is an inflammation of the iris, the membrane that surrounds the pupil of the eye. [EYE.] It most frequently originates in a disordered state of the system, as in gout or syphilis, but it sometimes follows the exposure of the eye to an intense light, or is produced by external injury, as the wound which is made in the operation for cataract, &c.

Iritis is principally characterized by an effusion of lymph, both into the substance of the membrane, producing a peculiar dullness of its colour, and on its surface in the form of small masses which adhere at the edge of and around the pupil. The eye is at the same time irritable to light, and the pupil is closely contracted; there is redness of the conjunctiva, and a zone of a bright pink colour is usually seen surrounding the margin of the cornea.

Iritis is very likely to end in adhesions of the iris to the adjacent parts, by the lymph which is deposited upon it becoming organized, and having its vessels united with theirs; in which case, irregularity in the form of the pupil, a loss of its power of contracting and dilating, or even its complete closure and obliteration, with corresponding degrees of obscurity of vision or total blindness, may ensue. These results may be produced in a few days; and the treatment must therefore be prompt and vigorous. Blood must be freely and sometimes repeatedly drawn from the arm, or by cupping and leeches from the head or neck; mercury must be administered in frequent and full doses till salivation is produced, and belladonna should be applied to or around the eye, to produce dilatation of the pupil and thus prevent its being closed.

IRKUTSK. [SIBERIA.]

IRON. Of all the metals iron is the most widely diffused, the most abundant, and the most useful. It is found not only intermixed with soils, and contained in rocks and minerals, but it is even met with in some animal and vegetable bodies, and also in mineral waters.

Iron occurs rarely, if indeed at all, in nature in the metallic state, for almost the whole of it that has been found occurs as meteoric iron containing nickel, or in meteoric stones. It has however been stated that it has been discovered *in situ* near Canaan in the United States; it there occurs in a vein, two inches wide, in chlorite schist, filled with native iron. It appears that this iron is traversed by graphite. Its specific gravity is 5·95 to 6·71. The Uralian Mountains yield a kind of native iron which is accompanied with platinum.

The greatest quantity of iron is found either combined with oxygen, oxygen and carbonic acid, or with sulphur; the last mentioned is not however worked as an ore. The best iron ores are oxides, which occur in primitive countries, where they generally form very large beds; such are those o Sweden: but the greater part of the iron ore of Britain is an impure carbonate.

The properties of iron are, that it is greyish-white with a tint of blue; it is extremely ductile, so that it may be drawn into wire finer than the human hair, but it cannot be beaten into very thin leaves. It is of all metals the most tenacious, for a wire 0·787 of a line in diameter is capable of supporting a weight of about 550 lbs.

Iron is susceptible of a high polish. It is combustible when minutely divided, as in the state of filings, which is shown by sprinkling them in the flame of a spirit lamp. It is very hard at common temperatures, and this property may be increased by its being heated and then suddenly cooled; it then however becomes brittle. It requires a most intense heat to melt it, but when heated to redness it becomes soft and pliable, and possesses the valuable property of *welding*, that is, two pieces of red-hot iron may be made to unite by hammering. Its texture is fibrous. Its specific gravity is about 7·77, but this varies in some degree according to the extent to which it has been drawn, rolled, or hammered, and it is increased by fusion. Iron, or rather steel, is capable of being rendered permanently magnetic, a property which no other metal possesses but nickel: when heated to redness this property is lost, and a loadstone suffers the same loss just below visible ignition; while a steel magnet loses its polarity when subjected to the temperature of boiling almond oil. Iron has great affinity for oxygen and sulphur, and some other elementary bodies, and combines with them in various proportions.

Having now stated the general properties of this metal, we proceed to describe those compounds which occur naturally containing the largest quantity of it, and among these are of course the various ores of this metal: and we shall prefix a short account of the more remarkable masses which have occurred of

Meteoric Iron.—There have been found in different parts of the earth large masses of native or metallic iron, of the

history and origin of which nothing very accurate is known; but they are regarded as being of meteoric origin, for it is invariably found that, like the iron which occurs in meteoric stones, this metallic iron contains nickel, and no such compound or mixture is found in the earth in veins or beds: and in point of fact two masses of such iron were seen to fall at Hradschina, near Agram in Croatia, in 1751. It contained 3·5 per cent. of nickel. Similar masses have been found in Africa, America, and Siberia; that in the last-mentioned part of the world was discovered by Professor Pallas: it weighed 1600 lbs., had a cellular structure, and contained crystals and grains of a green substance of a vitreous appearance, which have been stated to be olivine. This iron contains only 1·5 per cent. of nickel. One of the largest masses is that found in Peru by Don Rubin de Celis; it weighed 15 tons, and contained nickel. This was also the case with the knives which Captain Parry obtained from the Esquimaux. The largest quantity of nickel contained in any specimen was about 10 per cent.

Meteoric iron sometimes occurs crystallized; the primary form is the cube, and it is stated to have been found in regular octohedrons. It has no apparent cleavage. Fracture hackly; hardness 4·5; specific gravity 6·48 to 7·768; opaque; lustre metallic; colour pale steel grey.

OXIDES OF IRON.—The protoxide of iron does not occur in nature, except in combination, and usually with carbonic acid: that which most nearly approaches it is

Magnetic Iron, sometimes called *oxydulous iron* and *octohedral iron*. This ore is found crystalline, massive, and arenaceous. The crystals occur attached and imbedded. The primary form is a cube, but it is generally met with in the form of the regular octohedron. Cleavage parallel to the planes of the octohedron, but not obtainable in some varieties. Fracture uneven or conchoidal; hardness 5·5 to 6·5; scratches fluor-spar, and is scratched by quartz; specific gravity variously stated from 4·4 to 5·094; opaque; lustre metallic, occasionally bright; colour iron or steel grey; streak black; obeys the magnet.

Massive Varieties amorphous; structure granular to compact. It is of this variety of iron ore that native loadstones consist. This ore occurs in various parts of the world, especially in the North of Europe, and it is of it that the best Swedish iron is made, and so also is the iron which yields the wootz steel of the East Indies. It is generally found in primitive countries. This ore frequently contains titanium; but the varieties have not been well distinguished. By the blowpipe it becomes brown, and loses its magnetic property, but does not fuse.

It consists of 28·4 of oxygen and 71·6 of iron, which are equal to

Two equivalents of sesquioxide of iron	80
One equivalent of protoxide of iron	36

There are several ores, which possess very different appearances, that are altogether composed of the sesquioxide or peroxide of iron, and which are principally the *oligiste iron ore* and the *hematite*.

Oligiste Iron; Specular or Micaceous Iron.—This occurs crystallized and massive. The crystals are attached; the primary form is a rhomboid. Cleavage parallel to the primary planes and perpendicular to the axis in some varieties; fracture uneven, conchoidal; hardness 5·5 to 6·5; scratches phosphate of lime; is scratched by quartz; specific gravity 5·0 to 5·25; lustre metallic; colour steel and iron grey; the surface frequently iridescent; obeys the magnet slightly; streak red and reddish-brown.

It is found in the island of Elba and in many other parts of Europe. It also occurs in the lava of Auvergne in France, and in that of Vesuvius.

Goethite, Pyrosiderite.—Occurs in very thin transparent crystalline plates in the cavities of black hematite. Colour brownish red, by reflexion yellowish, in a strong light of a brilliant red; lustre adamantine. It occurs in England and in Germany. The former yielded by analysis

Peroxide of iron	89·2
Water	10·8
	100·

Iron Froth consists of very thin brownish red scaly particles, which have a greasy feel, and stain the fingers. It is found plentifully in Devonshire and Lancashire, and was ascertained by Dr. Henry to be pure peroxide of iron. The massive varieties are amorphous; structure foliated.

Red Hematite occurs in globular and botryoidal masses. Structure fibrous, radiating, opaque. Specific gravity 4·7 to 5. Lustre externally, sometimes metallic, sometimes dull; internally, nearly dull. Colour externally red; greyish red, &c., internally, and streak red. It occurs in large quantity at Ulverstone in Lancashire, and in other parts of Great Britain and Europe. According to D'Aubuisson it consists of

Peroxide of iron	94
Silica	2
Lime	1
Water	3
	100

Brown Hematite; Hydrous Oxide of Iron; Brown Iron Ore.—Occurs in attached crystals and massive prisms. Primary form a right rhombic prism. Cleavage parallel to the short diagonal; fracture uncertain. Hardness 5·0 to 5·5. Specific gravity 3·93; lustre adamantine; nearly opaque; translucent. Colour brown of various shades. Streak yellowish brown. Occurs in Cornwall.

Massive Varieties.—Globular, reniform, and some of the varieties of brown and yellow clay iron-stone. Stalactitic, structure fibrous, or fibro-laminar. Sometimes occurs in pseudomorphous crystals. It occurs in most parts of the world. Analysis by D'Aubuisson:—

	Fibrous.	Compact.
Peroxide of iron	82	84
Water	14	1
Oxide of manganese	2	2
Silica	1	2
	99	89

Carbonate of Iron; Brown Spar; Spathose Iron Ore.—This occurs in attached crystals and massive. Primary form a rhomboid. Cleavage parallel to the primary planes, distinct. Fracture imperfect conchoidal; hardness 3·5, 4·5; specific gravity 3·6 to 3·829; transparent, translucent, opaque; lustre vitreous, inclining to pearly; colour white, yellow, red, and brown of different shades.

Massive Varieties: tabular, structure fibrous; botryoidal and globular (these being called *sphærosiderit*), structure fibrous, diverging; amorphous, structure foliated, granular, compact. Found in Cornwall, Scotland, and Ireland, and in other parts of Europe; and also in America.

Before the blowpipe it blackens and becomes magnetic, but does not fuse; in the reducing flame it colours borax bottle-green, and in the oxidating yellow; dissolves in acids with effervescence. Analysis, by Beudant, of the hexahedral variety:—

Carbonic acid	38·72
Protoxide of iron	59·97
Oxide of manganese	0·39
Lime	0·92
	100·

Clay Iron-Stone, or *Argillaceous Iron Ore*, consists essentially of carbonate of iron mixed with various proportions of earthy matter; on an average carbonate of iron forms about one-third of the abundant clay iron-stone of England, Wales, and Scotland. It occurs in beds and in coal deposits; it is found sometimes in globular masses, and also columnar.

Although various other minerals occur containing large quantities of iron, yet the above-described contain almost all the ores which are extensively used in the manufacture of iron. Other ferruginous compounds have been already described under arbitrary names, and others still remain to be noticed in alphabetical order.

Carburet of Iron; Graphite. [ANTHRACITE.]

Sulphur and Iron exist in combination in enormous quantities; the compounds which it forms are called *magnetic iron pyrites*, *iron pyrites*, and *white iron pyrites*.

Magnetic Iron Pyrites, Protosulphuret of Iron, occurs in embedded hexagonal crystals and massive; primary form a rhomboid; cleavage parallel to all the planes of a regular hexagonal prism; fracture uneven, sometimes conchoidal; hardness 3·5 to 4·5; scratches calcareous spar, and is scratched by felspar; specific gravity 4·63; opaque; lustre metallic; colour bronze yellow mixed with red; streak greyish black; obeys the magnet but feebly; soluble in dilute sulphuric acid; when exposed to the blowpipe on charcoal is converted into oxide of iron; occurs at Kongsberg in Norway and Andreasberg in the Hartz. Analysis by Hatchett:—

Sulphur	36·5
Iron	63·5
	100·

Massive Varieties amorphous; structure foliated, granular, compact; found in Cornwall, Wales, Germany, North America, &c.

Iron Pyrites; Martial Pyrites; Persulphuret, or bisulphuret, of Iron.—Occurs in attached and imbedded crystals, and massive; primary form a cube; cleavage parallel to the primary planes, distinct; less so parallel to the planes of the octohedron; fracture uneven, sometimes conchoidal; hardness 6·0 to 6·5; scratches felspar, and is scratched by quartz; colour brass-yellow; streak brownish-black; lustre metallic opaque.

Massive Varieties: amorphous, structure granular, compact; globular and stalactitic, structure fibrous or columnar, radiating; surface frequently reddish brown, owing to the loss of sulphur and acquisition of oxygen. It sometimes contains gold; the pyrites of Anglesey, Sweden, and Bohemia contains selenium.

By the blowpipe sulphur is expelled and magnetic oxide of iron remains. It is scarcely acted upon by dilute sulphuric acid, but nitric acid dissolves iron and deposits sulphur. Analysis by Hatchett:—

Sulphur	52·15
Iron	47·85
	100·

Iron pyrites occurs abundantly in every part of the world. It is frequently found in the form of various fruits. The amorphous occurs sometimes to a great extent in coal-beds. Very large crystals occur in Cornwall and South America. The massive varieties in general more readily become oxidized and converted into sulphate of iron than the crystallized, and hence it is largely employed in preparing copperas.

White Iron Pyrites occurs in attached crystals and massive. Primary form a right rhombic prism; cleavage parallel to the planes of the primary form; fracture uneven, granular; hardness 6·0 to 6·5; scratches felspar, is scratched by quartz; colour various shades of yellowish, greenish, and greyish-white; streak greyish-black; opaque; lustre metallic.

Massive Varieties, botryoidal, reniform, stalactitic, and amorphous. Structure diverging, fibrous, or columnar. It is found in Cornwall, Derbyshire, Bohemia, and various other mining districts. According to Berzelius it consists of

Sulphur	53·35
Iron	45·07
Manganese	0·70
Silica	0·80
	99·92

Having now mentioned those ores and compounds which contain most iron, we refer to ASSAYING for the means by which their value is determined. We now proceed to consider the artificial oxides and other compounds of iron which are procured by chemical agency.

Oxygen and Iron do not combine at common temperatures when both are quite free from moisture, but when filings moistened with a little water are exposed to the air, a black powder is formed by the absorption of oxygen, which is almost entirely protoxide of iron, and was formerly employed in medicine under the name of *martial æthiops*. Protoxide of iron, nearly pure, may also be procured by dissolving iron in dilute sulphuric acid, decomposing the solution by potash and drying the precipitate out of the contact of air.

The properties of this oxide are, that it is black, tasteless, insoluble in water, readily dissolved by most acids, and obeys the magnet. It is precipitated from its saline solutions by potash and ammonia in the state of white hydrate; tincture of galls and hydrosulphuric acid do not produce any alteration in its solutions; by the alcaline carbonates protoxide of iron is thrown down as a white carbonate, and by ferrocyanide of potassium as a colourless compound, which speedily becomes Prussian blue when exposed to the air. It is composed of

One equivalent of oxygen	8
One equivalent of iron	28
Equivalent	36

Magnetic Oxide of Iron.—This is the ore already described as crystallizing in octahedrons; it is obtained artificially by passing water over ignited iron in a porcelain tube; it is also formed when iron is heated in the open air, and the scales which fall from iron when it is rolled hot consist principally of this oxide. It is black, obeys the magnet, brittle, easily reduced to powder, insoluble in water, and by sulphuric acid is dissolved and separated into protoxide and sesquioxide; the solution is in fact a mixture of protosulphate and persulphate of iron. It gives a black precipitate with tincture of galls, and a blue one with ferrocyanide of potassium. It is composed of one equivalent of protoxide 36, and 2 equivalents of peroxide 80; or it may be regarded as constituted of

Four equivalents of oxygen	32
Three equivalents of iron	84
Equivalent	116

It is sometimes described as a $\frac{4}{3}$ oxide of iron.

Peroxide, or Sesquioxide, of Iron.—Various ores, among others hematite, have been described as consisting of this oxide, which is, in fact, common rust of iron, and it is obtained by the action of a plate of iron upon moist atmospheric air. It may be easily procured also by acting upon iron filings with nitric acid; when the acid is moderately strong, but little iron is dissolved, the whole being at once precipitated in the state of red peroxide. When more dilute, a solution of pernitrate is obtained, from which the alkalis precipitate peroxide, and ferrocyanide of potassium Prussian blue. Like hematite, this artificial oxide has a red colour; it is inodorous, insipid, insoluble in water, forms red solutions with acids, but does not readily dissolve in them when it has been heated. It is composed of—

One and a half equivalent of oxygen	12
One equivalent of iron	28
Equivalent	40

Chlorine and Iron combine to form two chlorides, the protochloride and the perchloride. The protochloride may be formed by passing dry hydrochloric acid gas over iron heated to redness in a porcelain tube; hydrogen gas is evolved, and the surface of the iron is covered with a white crystalline protochloride, which, if the temperature be much increased, sublimes. Or it may be prepared by dissolving the metal in hydrochloric acid, and evaporating the solution to dryness out of the contact of air. In this case also the hydrogen of the decomposed hydrochloric acid is evolved; the protochloride thus obtained is grey and crystalline.

This compound is very soluble in water, but insoluble in absolute alcohol; the solution by exposure to the air absorbs oxygen, sesquioxide of iron is precipitated, and sesquichloride of iron of a yellowish colour remains in solution. This salt is also decomposed by oxygen at a high temperature, chlorine being evolved and oxide of iron formed.

When the solution is carefully evaporated, rhombic crystals, which, like it, are of a green colour, are formed; they contain water and deliquesce by exposure to the air. The solution of protochloride of iron (frequently called protomuriate) dissolves nitrous oxide gas, and the solution has been used in eudiometry, for the purpose of absorbing uncombined oxygen gas. [EUDIOMETER.] It is decomposed by the alkalis, which throw down protohydrate of iron, and by their carbonates, which yield protocarbonates. It gives no precipitate with hydrosulphuric acid or tincture of galls, and a white one with ferrocyanide of potassium, which speedily becomes blue.

It is composed of—

One equivalent of chlorine	36
One equivalent of iron	28
Equivalent	64

Sesquichloride, or Perchloride, of Iron may also be prepared by two processes: first, by heating iron wire in dry chlorine gas; combustion attended with a red light ensues, and a compound is formed, volatile at a heat below redness, and which exists in the form of brownish iridescent scales. This salt is very deliquescent, and dissolves readily in water, alcohol, and æther, and the solutions have a yellow colour.

The second method of obtaining sesquichloride of iron is that of dissolving the sesquioxide in hydrochloric acid: a

reddish solution is formed, which, by evaporation till it becomes of the consistence of a syrup, yields reddish-brown crystals, which are very deliquescent and soluble. The aqueous solution of sesquichloride of iron is decomposed by the alkalis, yielding a precipitate of hydrated sesquioxide of iron. The carbonates produce the same effect, for sesquioxide of iron does not unite with carbonic acid. Tincture of galls gives, with the solution of this salt, a deep black precipitate, and ferrocyanide of potassium a deep blue precipitate, which is Prussian blue. It is sometimes called permuriate of iron.

Sesquichloride of iron is composed of—

One and a half equivalent of chlorine .	54
One equivalent of iron	28
Equivalent	82

Azote and hydrogen do not form any compound with iron, or at any rate no permanent compound, though it seems probable that nascent hydrogen volatilizes, if it does not unite with, a small portion of this metal, when used for preparing the gas by solution in an acid.

Fluorine and Iron.—The protofluoride may be formed by dissolving iron in a solution of hydrofluoric acid; small colourless square crystals are obtained, which are sparingly soluble in water, and become of a pale yellow colour by the action of the air. When heated they lose water, and may then be heated to redness without expelling the fluorine.

It is composed of—

One equivalent of fluorine . . .	18
One equivalent of iron	28
Equivalent	46

The perfluoride, or sesquifluoride, of iron is procured by dissolving recently precipitated sesquioxide in hydrofluoric acid; the solution is colourless. By evaporation a pale flesh-coloured substance is left, which has a somewhat astringent taste and is but sparingly dissolved by water.

It consists of—

One and a half equivalent of fluorine	27
One equivalent of iron	28
Equivalent	55

Bromine and Iron.—When the vapour of bromine is passed over red-hot iron wire, a yellow fusible bromide is formed, which is readily soluble in water. When also bromine mixed with water is made to act upon iron, a solution of the protobromide, of a greenish colour, is obtained.

It consists of—

One equivalent of bromine . . .	78
One equivalent of iron	28
Equivalent	106

A perbromide may also be formed. But these compounds are not important.

Carbon and Iron combine, and the resulting compound is steel, or perhaps it may be stated that steel contains carburet of iron. [STEEL.] By the long fusion of steel with charcoal, Stodart and Faraday obtained a highly crystalline compound, containing from 5 to 6 per cent. of carbon, whereas steel usually contains only from 1·3 to 1·78 per cent. When Prussian blue is decomposed without the access of air at a red heat, a carburet of iron remains, composed of one and a half equivalent of carbon and one of iron; it is a black pulverulent substance, which at a low heat takes fire in the air, when carbonic acid is given out, and sesquioxide of iron left.

The substances called graphite, plumbago, or black-lead, have been regarded as carburets of iron; it is however more than questionable whether the small and uncertain portion of iron which they contain is not in a state of mixture rather than combination.

Sulphur and Iron readily unite, and the native compounds have been already mentioned. Protosulphuret of iron, having much the appearance of the native mineral, may be formed by heating iron to whiteness and rubbing a mass of sulphur upon it. The sulphuret formed readily fuses, and should be dropped into water, removed from it, and dried. It may also be formed by other processes, as by adding a hydrosulphate to protochloride or protosulphate of iron. That made by the first process is of a bronze colour, moderately hard and brittle; that formed by the last is dark and pulverulent. When put into diluted sulphuric or hydrochloric acid, sulphuretted hydrogen gas is evolved, and a protosulphate or protochloride of iron formed. It is a very useful substance for the preparation of hydrosulphuric acid gas, by the action of these acids.

It is composed of—

One equivalent of sulphur . . .	16
One equivalent of iron	28
Equivalent	44

Bisulphuret, or Persulphuret, of Iron has been occasionally formed, both in the moist and dry way, artificially: fine yellow and well defined cubic crystals have been accidentally obtained during the preparation of hydrochlorate of ammonia from ammoniacal gas liquor. According to Berzelius, it may also be formed by cautiously heating the artificial protosulphuret with as much sulphur as it already contains; by this there is formed a bulky powder of a yellow colour and metallic appearance; it is not attracted by the magnet, nor does hydrochloric or sulphuric acid act upon it.

It is composed of—

Two equivalents of sulphur . . .	32
One equivalent of iron	28
Equivalent	60

Some other sulphurets of iron may be also artificially formed, but they are not of any great importance.

Phosphorus and Iron.—Diphosphuret of iron may be formed by several processes; the direct one is that of dropping phosphorus into a crucible containing red-hot iron wire; it is also obtained where the protophosphate of iron is heated with a charcoal-lined crucible; phosphorus and oxygen being expelled. It is a fused granular mass, having the colour and lustre of iron, is very brittle, and not acted upon by hydrochloric acid. It is said that what is called cold-short iron owes its brittle property to the presence of this compound.

It is composed of—

One equivalent of phosphorus . .	16
Two equivalents of iron	56
Equivalent	72

The perphosphuret of iron is obtained by the action of phosphorus on persulphuret of iron at a moderate heat, it resembles the diphosphuret in its properties.

It consists of—

Four equivalents of phosphorus . .	64
Three equivalents of iron . . .	84
Equivalent	148

Iodine and Iron.—When iron-filings are digested in a mixture of water and iodine, the metal is dissolved, and a green solution is obtained, which by evaporation yields green tabular crystals of protiodide of iron; these when fused leave an iron-grey coloured opaque mass, which is very deliquescent, and soluble both in water and in alcohol. The solution rapidly absorbs oxygen, and peroxide of iron is precipitated, unless an iron wire be kept in it. It is used in medicine.

It is formed of—

One equivalent of iodine . . .	126
One " iron	28
Equivalent	154

Periodide, or sesquiodide, of iron is formed by digesting iron with excess of iodine, and subliming the product. It is a red volatile compound deliquescent, and soluble in water and in alcohol.

It is composed of—

One and a half equivalent of iodine	189
One equivalent of iron . . .	28
Equivalent	217

Boron and Iron are made to combine with difficulty in any notable proportion. When hydrogen gas is passed over borate of iron heated to redness in a porcelain tube, there was obtained, according to Lassaigne, a boruret of iron consisting of 22·57 boron and 77·43 iron. It was of a silver-white colour and very brilliant; it was with difficulty acted upon by sulphuric or hydrochloric acid, because the boron set free enveloped the metal and prevented their action.

Selenium and Iron may be made to combine by heating filings of the metal with selenium. The seleniuret has a greyish colour with a tint of yellow; it is hard, brittle, and when heated by the blowpipe loses selenium; it is

decomposed by hydrochloric acid when heated, and the results are seleniuretted hydrogen and protochloride of iron.

It is composed of—

One equivalent of selenium . .	40
One „ iron	28
Equivalent	68

Having now described the more important compounds which iron forms with the elementary gases and non-metallic solids, we shall briefly describe some of its alloys, and then mention such salts as its oxides form with acids as are most useful and best known.

The Alloys of Iron are much less useful than might be expected from the extreme utility of the metal itself.

Potassium and iron, and sodium and iron, combine when heat is applied to them: the alloys are more fusible than pure iron, especially when in contact with the air. These alloys are decomposed by air and water. When a mixture of magnesia, iron filings, and charcoal is exposed to the melting heat of iron, the resulting globule contains traces of magnesium. With lime no analogous effect is produced.

Silicium and iron combine readily when silica is fused with iron filings and charcoal in powder. The compound is ductile or brittle according to the quantity of charcoal which it contains. Silicium does not appear to diminish the ductility of iron, nor does the alloy alter by exposure to the air when the silicium does not exceed 5 or 6 per cent. Iron combines also with aluminum and glucinum.

Arsenic combined with iron and with sulphur occurs as a mineral body. This contains nearly one-fifth of its weight of sulphur. In Silesia however an arseniuret of iron occurs, which consists of 65·88 arsenic, 32·25 iron, and 1·77 sulphur. This last may therefore be considered as accidental admixture. It is used for preparing arsenious acid and realgar.

An alloy of one part of arsenic and two parts of iron is obtained by heating in a covered crucible, until fused, a mixture of one part of iron filings and a little more than half a part of arsenic. It has a greyish-white colour, does not obey the magnet, is very brittle, and much more fusible than iron. When heated in the air the arsenic is converted into arsenious acid and volatilized, and oxide of iron is left. An alloy containing only one-fifth of arsenic obeys the magnet.

Chromium and iron may be combined. This alloy is but little known. With columbium iron forms an alloy hard enough to scratch glass. It is not at all ductile, is very difficult to break, and gives a brown powder. Acids dissolve the iron, leaving pulverulent metallic columbium.

Titanium does not appear to be susceptible of combination with iron. Zinc is with difficulty made to unite with iron, but yet in some operations a compound of these metals has been formed, the zinc constituting however much the larger portion. The alloy is white, has a metallic appearance, and is brittle. It has been proposed to cover iron with zinc, in the same way as with tin, to prevent oxidizement. As yet however it has not been rendered practically useful.

Tin and iron combine in tin plates, which are plates of iron, both sides of which are alloyed or combined with tin. According also to Bergman, when a mixture of tin and iron is fused, two separate layers are formed, each constituting a peculiar alloy of tin and iron: one of them, consisting of one part of iron and twenty parts of tin, is ductile, of a rather deeper colour than tin, and somewhat harder; whilst the other, composed of two parts of iron and one part of tin, is rather ductile, but so hard that it cannot be cut with the knife.

Antimony and iron unite when heated together in close vessels: the alloy is white, hard, brittle, and its specific gravity is less than that of the mean of the two metals. No metal appears to deprive iron more of its magnetic property than antimony.

No compound of tellurium and iron has yet been examined.

Cobalt and iron combine by fusion: the alloy is hard and magnetic.

Nickel and iron unite easily. It has already been mentioned that meteoric iron contains from about 2 to 10 per cent. of nickel. The artificial alloy is less liable to rust than iron alone; but when the nickel amounts to about 10 per cent. the ductility of the iron begins to diminish.

Bismuth combines with iron, but with difficulty; a very small portion of iron renders the alloy magnetic.

Molybden forms a bluish-grey brittle compound with iron. Equal parts of these metals may be fused by the blowpipe, but one part of iron and two parts of molybden form a bright grey compound, which is infusible by the blowpipe, attracted by the magnet, and of a fine grained fracture.

Copper is with difficulty combined with iron. The alloy is magnetic, even when it contains only one-tenth of iron. It is stated that iron which contains copper is rendered more tenacious, and does not become brittle till near a red heat.

Silver combines readily with iron when they are fused together, but they separate on solidification, and globules of silver appear on the surface of the alloy. When even the quantity of iron does not exceed 1-400th, it may be perceived that it is not combined but intermixed with the iron.

Mercury and iron do not unite directly. The addition of another metal favours the amalgamation. An amalgam may be obtained by digesting tinned plate in boiling mercury. The alloy is silvery-white, tenacious, almost ductile, and obeys the magnet. Other processes have also been proposed.

Lead and iron combine with difficulty. If a mixture of the two metals be fused, there are obtained two layers of alloy; the upper one is iron containing a little lead, and the lower one lead containing a little iron.

Rhodium and iridium may both be combined with iron and also with steel. [Steel.] Iron also unites with tungsten: the alloy is of a bright brown colour, hard, harsh to the touch, and brittle.

Gold and iron combine with facility. A compound of eleven parts of gold and one part of iron is nearly white. It is very ductile, and its specific gravity 16·885. An alloy of three parts of iron and one part of gold is of a silver colour, and is attracted by the magnet. Steel may be soldered with gold.

Iron and platinum, in equal quantities, form an alloy which is susceptible of a fine polish, and does not tarnish in the air. The colour of this compound is such as to render it very useful for reflectors. Its specific gravity is 9·862. Platinum may also be combined with steel. [Steel.]

Having described the more important binary compounds of iron, we shall consider those which its oxides form with some acids, and also notice some combinations which are not included in this class.

The action of acids upon iron is different, being greatly dependent upon their nature and composition. An aqueous solution of sulphurous acid dissolves the metal without the evolution of any gas whatever, and a solution of the protoxide is obtained; concentrated sulphuric acid, when cold, scarcely acts upon iron, but when they are heated the sulphuric acid is decomposed, sulphurous acid is evolved, and oxide of iron is formed; dilute the sulphuric acid, and then the water is decomposed, hydrogen gas is given out, and sulphate of protoxide of iron is formed. When iron is put into liquid hydrochloric acid, hydrogen gas is then also evolved, but this is derived from the decomposition of the acid, and not of the water, and the metal unites with the chlorine to form a protochloride. Nitric acid when concentrated has no action upon iron, whether cold or hot; but when diluted, nitric oxide is evolved, owing to the decomposition of the acid, and protoxide or peroxide of iron is formed, according to the degree to which the acid is diluted.

The first salt which we shall describe is the

Sulphate of Iron, or *Sulphate of Protoxide of Iron*. It is largely prepared for various purposes, especially for dyeing black, by exposing iron pyrites to the action of air and moisture, in masses which are called *copperas beds*. By absorbing oxygen, the sulphur becomes sulphuric acid, and the iron protoxide, and these combining form protosulphate of iron; as however there is great excess of sulphuric acid, pieces of old iron are added to saturate it, and the copperas, or green vitriol, is obtained in the state of crystals, by evaporating the solution.

For nicer purposes, especially for medicinal use, sulphate of iron is prepared by dissolving iron filings or turnings in dilute sulphuric acid; it may also be obtained by dissolving protoxide or protocarbonate of iron. The solution is of a bluish-green colour, and the salt obtained has the following properties: the primary form of the crystal is an oblique rhombic prism; its colour is bluish-green when recently

prepared, but by exposure to the air, and the partial peroxidizement of the iron, it becomes first green and eventually yellowish. Like the other salts of iron, it has a disagreeable styptic taste; two parts of cold water, and three-fourths of a part of boiling water, dissolve one part of this salt; when moderately heated it loses the greater part of its water and becomes white, and when subjected to a red heat it is partly converted into persulphate and partly into peroxide of iron; and when the heat is long continued, totally into peroxide; but when subjected to distillation without the free contact of air, it yields a peculiar kind of sulphuric acid. This salt is insoluble in alcohol; the aqueous solution is decomposed by the alkalis, which precipitate hydrated protoxide of iron; by the alkaline carbonates, which throw down protocarbonate of iron; and by ferrocyanide of potassium, which, when the solution is quite free from peroxide, gives a white precipitate, but if any peroxide be present, which is generally the case, then the colour of the precipitate is more or less blue, dependent upon its quantity; tincture of galls also gives no precipitate in a solution of perfect protosulphate of iron, but, for the reason already stated, it generally gives more or less of a dark-coloured precipitate. The aqueous solution, when exposed to the air, owing to the peroxidizement of the iron, gradually lets fall a precipitate which is a subpersulphate of iron. The solution also absorbs nitric oxide, and hence is used in eudiometrical processes. [EUDIOMETER.]

Sulphate of iron is composed of—

One equivalent of sulphuric acid .	40
One equivalent of protoxide of iron	36
Seven equivalents of water . .	63
Equivalent	139

We have given a rather detailed account of the properties of this salt, because it may be considered as a type of the soluble salts of protoxide of iron, and will save useless repetition.

Sulphate of Peroxide of Iron, or *Sesquipersulphate of Iron*, may be considered as representing the soluble salts of peroxide of this metal. It may be prepared by dissolving the moist peroxide, obtained by decomposing the solution of the perchloride with an alkali, in dilute sulphuric acid; but it is generally formed by heating a solution of the protosulphate with nitric acid, which being decomposed yields oxygen to the protoxide and converts it into peroxide. This solution is of a reddish colour when concentrated, and yellowish when diluted. No crystals are obtained by evaporation, but there remains a brown deliquescent mass; its taste is very astringent, and it is soluble in alcohol; when concentrated sulphuric acid is added to a strong solution of this salt, it is precipitated in the state of a white anhydrous powder. The solution, like that of the other persalts of iron, gives a yellow precipitate of hydrated peroxide with the alkalis, an intense blue one with ferrocyanide of potassium, and a very dark one with tincture of galls. It is decomposed by heat, which expels the sulphuric acid, and leaves peroxide of iron. This salt exists in what are termed the *mother waters* of the copperas-makers, and it is also formed, though very slowly, by the action of the air upon a solution of the protosulphate of iron· a subpersulphate being precipitated.

It is a sesquisalt, composed of—

One equivalent and a half of sulphuric acid .	60
One equivalent of sesquioxide, or peroxide .	40
Equivalent	100

Nitrates of Iron. Of these, as of the sulphates, there are two. When iron is acted upon by very dilute nitric acid, a protonitrate of a pale green colour is obtained; but when the acid is moderately diluted pernitrate of iron is formed: this resembles the persulphate in its more important properties, and is, like it, a sesquisalt.

Carbonate of Iron. It is only the protoxide of iron which combines with carbonic acid to form a solid compound. It has already been mentioned that carbonate of iron exists in nature, and is the basis of what is termed the *argillaceous iron ore;* it sometimes also occurs pure in transparent rhombic crystals, much resembling calcareous spar in appearance. The crystals are however more commonly yellowish-brown, and constituting what is called *spathose iron ore.* Carbonate of iron is precipitated from the solution of the protosulphate by the alkaline carbonates; but on account of the facility with which the protoxide absorbs oxygen, it is almost impossible to obtain it perfect, in a dry state. Carbonate of iron is decomposed by heat and by acids, which expel the carbonic acid. Carbonate of iron, held in solution by excess of carbonic acid, exists in chalybeate waters.

It is composed of—

One equivalent of carbonic acid .	22
One equivalent of protoxide of iron	36
Equivalent	58

Phosphates of Iron. The protophosphate occurs in Cornwall, America, &c. It is sometimes called *Vivianite.* The primary form of the crystal is an oblique rhombic prism. Cleavage parallel to the oblique diagonal; fracture indistinct; hardness 1·5 to 2·0; colour various shades of blue and green; streak lighter than colour; lustre vitreous; translucent; transparent; specific gravity 2·6 to 2·7. Soluble in dilute sulphuric and nitric acids without effervescence. Before the blowpipe on charcoal intumesces, reddens, and melts into a steel-grey globule with metallic lustre. *Massive varieties,* aggregations of crystalline particles, or globular and amorphous earthy masses.

Analysis of the crystallized (No. 1) by Stromeyer, and of the earthy (No. 2) by Klaproth:—

	No. 1.	No. 2.
Phosphoric acid .	31·18	47·5
Protoxide of iron .	41·23	32·
Water . . .	27·49	20·
	99·90	99·5

This compound may be formed artificially by adding a solution of phosphate of soda to one of protosulphate of iron; the precipitate is at first blue, but by attracting oxygen from the air it is converted into perphosphate, and then becomes white. It is soluble in most acids, and may be precipitated from them by ammonia without being decomposed.

Perphosphate of Iron is white; it is obtained by adding phosphate of soda to persulphate of iron. Like the protophosphate, it is insoluble in water, but dissolved by acids, and may be precipitated from them unaltered.

Arseniates of Iron. [ARSENICAL MINERALS.] The protoarseniate of iron is obtained by adding arseniate of potash to a solution of protosulphate of iron; a greyish precipitate of protoarseniate is obtained, which by exposure to the air absorbs oxygen and becomes darker. The perarseniate of iron is obtained by precipitating a solution of the persulphate by arseniate of potash. It is a yellowish-white insoluble powder.

Chromate of Iron. [CHROMIUM.]

Tungstate of Iron. [TUNGSTEN.]

Percyanide of Iron. Prussian Blue. [BLUE.]

We shall conclude this part of the subject with a brief account of the

General properties of the Salts of Iron. Those salts which contain or yield the protoxide are distinguished by the following properties:—They give no precipitate with tincture of galls or hydrosulphuric acid; a white one, which becomes speedily blue on exposure to the air, with ferrocyanide of potassium, and a blue one with the sesquiferrocyanide. Solution of chloride of gold, and especially of the sodium chloride, gives a dark-coloured precipitate, and when nitrate of silver is added to protosulphate of iron metallic silver is precipitated. The alkalis throw down a colourless hydrate, and the alkaline carbonates precipitate protocarbonate of iron. The salts of iron which contain the peroxide, or sesquioxide, are distinguished from those of the protoxide by giving a deep blue or black precipitate with tincture of galls; the ferrocyanide of potassium also gives a deep blue, but the sesquiferrocyanide gives none at all. Hydrosulphuric acid reduces them to the state of protoxide, sulphur being precipitated. Ammonia, and the solutions of potash and soda, give a yellowish hydrate.

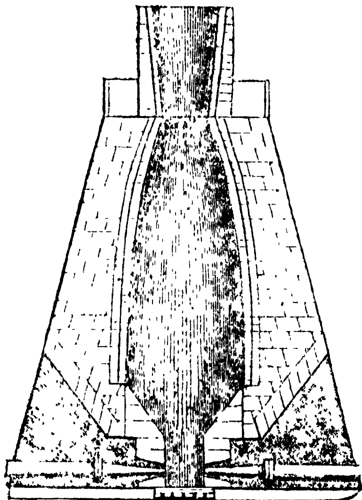
There are however some exceptions to the production of these effects: thus the tartrate of potash and peroxide of iron, the ferri potassio-tartras of the Pharmacopœia, gives no blue precipitate with ferrocyanide of potassium, nor is it precipitated by ammonia or the alkaline carbonates; but potash, when the mixture is heated, throws down hydrated peroxide of iron.

IRON MANUFACTURE AND TRADE.—The art of smelting iron was practised in this country during the time of the Roman occupation and in many antient beds of cinders, the refuse

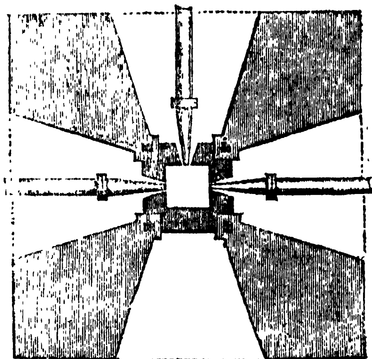
of iron-works, Roman coins have been found. The principal antient seats of the iron manufacture in this country appear to have been Sussex and the Forest of Dean, or Arden, as it was then called. It is known that iron-works existed in that part of Gloucestershire in 1238, because there occurs among the patent rolls of Henry III. of that date, one entitled 'De Forgeis levandis in foresta de Dean.' Remains of antient iron-furnaces have been noticed in Lancashire, Staffordshire, and Yorkshire. The art of working in iron and steel was much practised in this island before the Norman conquest, and we are told that not only was the army of Harold well supplied with weapons of steel and with defensive armour, but that the horses were covered with steel and iron armour, and that every officer of rank maintained a smith, who constantly attended his master to the wars, and took charge of his arms and armour to keep them in proper repair.

There are two distinct qualities into which this metal is commonly divided, viz. pig-iron, and malleable or bar iron, the second being the result of an extension of the processes necessary for the production of the first kind—pig-iron.

The first process is that of reducing the iron-stone or ore, or, as it is technically called, the *mine*, into a metallic state by means of fusion. This operation is conducted in a blast-furnace, the form and construction of which will be understood from the following section. The interior of this



furnace in the broadest part, which is called the *boshes*, is usually from 14 to 17 feet in diameter, and this is gradually decreased to about half that diameter at the top. The whole is built of masonry, the lining to the furnace being composed of fire bricks carefully jointed together with fire-clay: the whole furnace is strongly bound together with iron hoops or stays. The furnace is again contracted below the boshes, and into this lower part the melted iron falls as it is formed. The ground-plan of this lower part of the furnace is constructed according to the following diagram, where the unshaded square in the centre represents the



hearth, and is about 3 feet square. The three tubes leading to this hearth (two of which are shown in the section above), and which are called *tuyeres*, are used for introducing the blast of air required to give the degree of intenseness to the heat which is necessary for fusing the ore. The furnace is charged from the top with certain proportions of iron-ore, of coke, and of limestone. The ore must previously have been roasted or calcined in a kiln, in order to drive off the water, sulphur, and arsenic, with which it is more or less combined in its native state: by this process it loses one-sixth part of its weight. A furnace of the size commonly used in Wales will produce from 5 to 6 tons of pig-iron in twelve hours. For the largest quantity the furnace must be charged progressively with 15 tons of roasted iron-ore, 22½ tons of coke, and about 6 tons of limestone. These ingredients are supplied at 50 charges, and must be intimately mixed together in the furnace. The limestone must be broken into small pieces; its use is to act as a flux to the ore and promote its fusion. The heat that would be produced in any furnace by merely setting fire to the fuel which is contained in it would be altogether insufficient for the fusion of the ore, if its intenseness were not promoted by the forcing in of a current or blast of air. For this purpose it is necessary to use a strong mechanical force, and of late years the agency of steam has been most commonly employed for this purpose. Water-wheels, where they can be had, are of course cheaper agents; but there are not many places where a sufficiently copious and regular supply of water at all seasons can be commanded, and the success of an iron-work would be destroyed by the failure of the blast in any degree for even a short time. Steam-engines are therefore usually preferred. This power is applied to the working of a blowing cylinder, which may be four times the area of the cylinder of the steam-engine. If the blast thus produced were passed immediately from the blowing cylinder through the tuyeres to the furnace, the effect would be intermitting and irregular, ceasing at the end of each stroke of the steam-piston. To remedy this inconvenience the blast is carried into an intermediate chamber of a spherical or cylindrical shape, called a regulator, and as the air is in a state of condensation when admitted, its effort to expand itself again to its natural volume causes the continuous and regular supply to the furnace which is necessary. The air thus forced into the furnace keeps the heat at the degree of intenseness which is indispensable for the smelting of the ore. Until the last few years the air thus supplied was uniformly at the temperature of the atmosphere from which it was immediately taken, and the effect was not only to produce a lower degree of heat, but also to supply a quantity of moisture which is prejudicial to the smelting process. Atmospheric air always contains moisture in some degree or other, but holds a larger proportion in hot than in cold weather, for a very obvious reason, and this causes the furnaces not to work so well in summer as in winter. By the previous drying and heating of the air these inconveniences are remedied, the consumption of fuel is lessened, and the absence of moisture is said to have a beneficial effect upon the quality of the iron produced. This improvement is the invention of Mr. Neilson, of the Clyde Iron-works, and has been made the subject of a patent. It is probable that when, by the expiration of the term of the patent, this invention may be freely used without compensation to the inventor, it will be adopted universally; at present it is used only partially, but still in an increasing degree, and its adoption has very recently made great progress in France, where it has been strongly recommended by the government engineers, after one of them, M. Le Play, had investigated the subject in Scotland in 1836. The air, before it is forced into the furnace, is heated in cast-iron vessels to about 300° Fahr., and is thus more nearly than when at its natural temperature in a condition to support combustion. The saving of fuel in the furnace is found to exceed by ten times its weight the quantity of coal used for the preliminary heating of the air. It is supposed that the improved quality of hot-blast iron is the result of the state of dryness which is thus attained.

The iron is run from the furnace every twelve hours, by tapping it in the front, on a level with the bottom of the hearth, at the side on which, as will be seen from the diagram, there is no tuyere introduced. When the furnace is tapped the metal is allowed to run into channels formed in the sand of the smelting-house floor. The names of *sow-metal* and *pig-metal*, which were originally given by the workmen, signify in one case the blocks of iron which are formed in the large main channels, and in the other case the smaller blocks which are formed in smaller side channels communicating with the larger ones; these names were adopted from the fancied resemblance of the cast

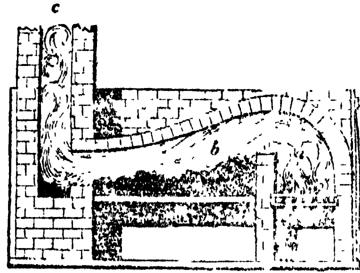
metal to a sow and her litter of pigs: this is iron in its crudest state. The weight of materials lost in its production is somewhat greater than that of the fuel used; taking into account the refuse cinder and ashes with the metal, the whole does not weigh quite so much as the ore and lime that have been put into the furnace. Large heaps of cinder are gradually accumulated in the neighbourhood of iron-works, and give a dreary aspect to the country.

The quality of pig-iron varies according to the purposes for which it is intended, and depends not only upon the quality of the ore, but also upon that of the fuel. The principal division is into foundry-iron and forge-iron, the former being used for castings, the latter for conversion into malleable iron. Foundry-iron is further divided into three qualities, distinguished by the numbers 1, 2, and 3. No. 1 contains a large proportion of carbon, which it has acquired from the coke used in smelting, and the quality of which has been chosen with a view to the production of this kind of iron, which is soft and very fluid when melted, so that it will run into the finest and most delicate forms the moulder can produce. No. 2 contains a smaller proportion of carbon; it is harder than No. 1, closer grained, and of more regular fracture; it is more refractory in the furnace, and does not run so freely when melted as No. 1, but as it is harder and stronger it is preferred for purposes where strength and durability are required in preference to delicacy of form: these two kinds are unfit for conversion into bar-iron. No. 3 varies in the same direction as No. 2, but in a greater degree, from the qualities of No. 1; it is used for many kinds of heavy work where it has to bear great strains and is exposed to constant wear. Forge-iron is divided also into three qualities, and is distinguished as *bright iron*, *mottled iron*, and *white iron*, which names are indicative of the appearance which each quality presents to the eye; they all of them contain some carbon, but less than foundry-iron, and in proportions diminishing in the order in which they are here mentioned, white iron having the smallest proportion of any, and being exceedingly hard; its fluidity too is so small that it runs with difficulty into the channels provided to receive it at the first smelting, and it is altogether incapable of being afterwards used for foundry purposes.

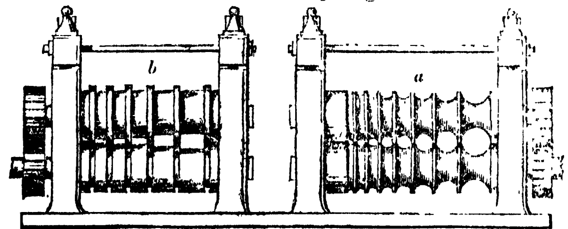
Forge or bar iron is pig-iron freed from carbon and oxygen. The first operation for producing this change is called refining, and is performed in small low furnaces about three feet square at the base, having the bottom, or hearth, of fire-bricks, and the sides of cast-iron, made hollow to allow a stream of water to pass constantly through, which prevents their being quickly burnt away; near the top are holes for the insertion of blast-pipes. These refineries have iron doors at the back, but are open in front; the whole is surmounted by a chimney of brick-work carried to the height of 20 feet from the ground. At the level of the hearth in front is a hole similar to that in the smelting-furnace for running out the melted metal. This communicates with a flat mould of cast-iron 20 feet long and two feet wide, placed over a cistern of water with which its under surface is in contact, and which serves to cast the metal rapidly as it runs into the mould. The iron is kept in a state of fusion in the refinery for some time exposed to an intense heat produced by a strong blast. From the sudden cooling to which it is exposed, the plate when run into the mould is very brittle: when broken the fracture presents a bright silvery appearance. The operation of refining requires about two hours for its performance, and as the weight of each plate when run out is about one ton, each refinery is capable of being made to yield about 70 tons weekly. From 22 to 23 hundred-weight of pig-iron are required to produce one ton of refined iron, and from 10 to 12 cwt. of coke is used for the purpose.

The first process employed for making bars is called puddling, and is performed in a reverberatory furnace, thence called a puddling-furnace: the structure of this furnace will be explained by the following diagram:—In this diagram *a* is the grate, which is supplied with coal through a door in the side. The refined metal broken in small fragments is placed in the body of the furnace *b*, over which the flame is made to play in its passage to the chimney *c*.

The degree of the draft is regulated by a damper on the top of the chimney, which is about 30 feet high. Such is the intenseness of the heat in these furnaces, that when the damper is raised the flame is sometimes carried to the top of the chimney. The quantity of refined metal put



into this puddling-furnace at each charge is from 3½ to 4 cwt. In about half an hour from the charging of the furnace the metal begins to melt. The puddler then observes, through a small hole provided for that purpose and for the introduction of his tools, the progress of the work. The business of the puddler is so to dispose of the pieces of metal, moving them by means of his tools, as to ensure an equable application of heat to the mass. When the whole quantity is fully melted, the puddler stirs the metal about briskly, changing his tools continually that they may not be melted. By means of this agitation the metal gives off an elastic fluid, and after a time becomes thick, and grows increasingly so, until it loses all fluidity and forms into lumps. The contents of the furnace are then divided into five or six portions by the puddler, and each is made up by means of his tools into a spherical form. These balls are technically called *blooms*. Being taken from the puddling-furnace they are subjected each to 10 or 20 blows from a heavy hammer (called shingling), which makes them more compact and gives them a shape more convenient for going through the rollers. The form and construction of these rollers are shown in the following diagram. The bloom is



passed in succession through the holes in *a*, beginning with the largest and proceeding to the smallest; it is then passed through the grooves in the second roller *b*, and is thus reduced to the requisite width and thickness, having by these several processes been converted from a fusible, hard, and brittle substance, to a tough and elastic bar which is hardly fusible, and which from its property of yielding and altering its form under the hammer has acquired the name of malleable iron.

The quantity of refined metal required to make one ton of these rough bars is about 22 cwt., and the quantity of coal consumed in the process is about 17 cwt. The bars, when they have been passed through these rollers, and while yet hot, are cut into convenient lengths and taken to the balling-furnace, the shape and construction of which resemble those of the puddling-furnace. In this balling-furnace the bars are piled evenly, so that one bar does not project beyond another. Several of these piles, each of which is composed of five or six bars, are placed at once in the furnace, and when sufficiently heated, so that they will weld together, the piles are taken out separately and are passed again through rollers similar in construction to those described above, but differing from each other in the form of their orifices and grooves, so that either round or flat or square rods and bars may be produced at the pleasure of the maker, and these when weighed and put up into bundles are ready for sale.

There are no means of ascertaining correctly the quantity of iron made in this country. Estimates have been formed at different periods, but these are at best but approximations to the truth: these estimates are as under:—

1740 . . .	17,000 Tons.
1788 . . .	68,000 „
1796 . . .	125,000 „
1806 . . .	250,000 „
1820 . . .	400,000 „
1827 . . .	690,000 „

More recently (in 1836) the gentleman who has been already mentioned as an engineer in the employ of the French government, M. Le Play, having visited every ironwork in the United Kingdom, ascertained that the quantity produced was one million of tons, which was probably not beyond the truth at that time. In the following year several furnaces were put out of blast, but it is probable that the quantity in 1838 will again reach, if it do not exceed, the quantity just mentioned. The quantity of iron conveyed upon the Monmouthshire and Glamorganshire canals in 1837 amounted to 256,810 tons, including 20,000 tons of railway iron from the Dowlais works alone.

The manufacture of iron has increased very considerably of late years in France, and since the establishment of mining inspectors in that country we know precisely the quantity produced within the year. Since 1832 the produce has been—

	Pig Iron Tons.	Malleable Iron. Tons.
1832 . . .	221,660 . . .	141,336
1833 . . .	232,559 . . .	149,982
1834 . . .	265,028 . . .	174,507
1835 . . .	290,378 . . .	206,396
1836 . . .	303,739 . . .	201,691

The iron trade of England in all its various branches is of very great importance. Its growth since 1814 has been exceedingly rapid, as will be seen by the following statement of exports in each year:—

Year	Bar Iron Tons.	Pig Iron Tons.	Castings. Tons.	Hardwares & Cutlery. Tons.	Steel unwrought. Tons.	Total declared Value. £
1814	15,168	307	5,034	6,162	323	
1815	18,[illegible]	166	5,320	15,472	1221	
1816	20,979	953	6,388	13,914	917	
1817	31,310	4,057	6,322	8,190	475	
1818	4[illegible],095	3,048	6,303	11,057	704	
1819	[illegible]	906	7,[illegible]70	8,619	491	
1820	36,848	2,746	5,186	6,617	3[illegible]6	
1821	31,093	1,484	4,506	9,037	515	
1822	33,395	5,095	4,810	10,466	564	
1823	33,138	7,545	5,730	10,375	479	
1824	25,871	2,093	6,717	12,285	570	
1825	[illegible]	2,815	5,944	10,980	533	
1826	33,253	6,563	5,940	9,627	472	
1827	45,284	7,095	6,292	12,433	535	2,610,442
1828	51,108	7,826	6,205	12,100	917	2,613,821
1829	56,178	8,931	8,219	13,028	714	2,553,482
1830	5[illegible],885	12,036	8,854	13,269	832	2,490,630
1831	64,012	12,444	10,361	16,799	1907	2,745,801
1832	71,024	17,566	12,495	15,294	1112	2,625,180
1833	[illegible],333	22,988	14,763	16,497	1587	2,871,397
1834	70,809	21,788	13,870	16,275	1709	2,8[illegible]2,105
1835	94,383	33,073	12,604	20,197	2810	3,477,784
1836	88,536	33,880	19,891	21,072	3014	4,613,987

See *Manufacture of Iron* in the 'Library of Useful Knowledge.'

IRON, *Medicinal Properties*. [CHALYBEATE SPRINGS.]

IRON BRIDGES. [BRIDGES.]

IRONY (εἰρωνεία), a refined species of ridicule, which under the guise of earnestness and simplicity exposes all undue pretensions, even while it professes to honour and admit them. It stands intermediate between naïveté, or frank simplicity, on the one hand, and banter and persiflage, on the other. From the former it is distinguished by the consciousness and intention of ridicule, which object again is more covert and less transparent in irony than in the latter. By Aristotle the ironical is opposed to the boastful (τῷ ἀλάζονι), and as a middle term between *the two* he places the truthful (τὸν ἀληθῆ). The Latins translated the word irony by 'dissimulatio,' which however Quintilian (lib. ix., c. 2) disapproves of as very inadequate, and preferred the original, for which we are indebted to the refinement of the Athenians, among whom Socrates, the master in this art, was called emphatically the Ironical (ὁ εἴρων). The strict etymology of the term is very doubtful. One explanation, looking to the so-called Socratic method of question and answer, takes it to mean simply 'the interrogator;' while another would derive it from εἴρειν, to fasten, which may have had reference to the skill wherewith Socrates reduced the sophists to the necessity of adopting some fixed and stable point for discussion, instead of loose and slippery declamation, which, as more favourable to delusion and fallacy, they preferred. Both explanations equally leave out of consideration that element of latent mockery which predominates in the modern acceptation of the word, but which was probably only accessory to the original idea. For while the serious object of the Socratic irony, in which he presented himself as desirous to learn of those whose claim to wisdom he laboured to expose, was to awaken reflection by the development of the consciousness, he nevertheless combined with it all the Attic urbanity and wit. It was consequently of two kinds, a finer and a grosser, according as he had to do with the more presumptuous arrogance of the sophists, whose undue and pernicious reputation he sought to subvert, or with those younger but not less conceited spirits, who yet sought his society for the sake of benefit and improvement, and therefore required a milder and more merciful treatment.

The ironical argument proceeds in simulated ignorance, and by appearing to agree with those whom its purpose is to refute, in holding certain erroneous opinions and maxims, brings out the antagonism of truth to error, and gradually involves them in inextricable difficulties. On this account it has been considered a species of apogogical argument (τῆς εἰς ἀδύνατον ἀπαγωγῆς), or reductio ad absurdum.

As a figure of rhetoric, it is correctly defined to be that mode in which our words convey a sense directly contrary to what we express, but agreeable to what we mean and are understood to mean. (Beattie, *Moral Science*, c. i. § 1, p. 4.) In an opposite and somewhat extended sense those mistakes have been called ironical wherein our intended expressions receive an inverted signification.

Since the essence of irony consists in its serious and seeming simplicity, it is essential to its successful application that it should advance gradually to its ultimate object of exposure, and neither lose its covert character by rising too suddenly to exaggeration and extremes, nor yet so closely veil itself but that the intention of ridicule may appear through the assumed mask of earnestness and simplicity.

Of English writers Swift contains the strongest and the most numerous examples of irony.

IROQUOIS, or MOHAWKS, an Indian tribe in North America, formerly known also under the name of Mengwe, or Six Nations, inhabited the country between the present town of Montreal and Lake Ontario. This once powerful and numerous tribe gradually diminished as the European settlements in their country increased, and at present the number of individuals composing it probably does not exceed 1600. They inhabit two villages not far from the southern banks of the river St. Lawrence. Coghnawaga, opposite the island of Montreal, contains about 900 inhabitants, and St. Regis more than 700. The last-mentioned village is situated where the boundary-line between Canada and the United States strikes the river St. Lawrence, so that one half of the village is within the British territories and the other belongs to the state of New York. The Iroquois have quite changed their manner of life; they derive their subsistence from the produce of their fields, in which they cultivate rye, Indian corn, potatoes, and peas, and from the rearing of some poultry and hogs. They also fish and hunt, but these are no longer considered their principal employment. Their language, which they still speak, differs considerably from that of the Crees, who inhabit the country farther west, but does not seem to differ from that of the Wyandots, Nadowessies, and Asseneepoytuck, and hence the language of all these tribes is called Iroquois.

(Bouchette, *Topogr. Diction. of Lower Canada*; Carver's *Travels through North America*; Dr. Richardson, in Franklin's *First Journey to the Polar Sea*.)

IRRATIONAL QUANTITY. The distinction between quantity in general and number, or rather between the ratio of quantity to quantity, and that of number to number, has begun to appear in the article INCOMMENSURABLE, of which the present may be taken as a continuation. It there appears that there are such things as magnitudes which are not in the proportion of any one number to any other; though if we may use numbers as great as we please, we can find a pair which shall be as nearly as we please in the ratio of any two given incommensurable quantities.

According to the modern use of the term irrational, it simply means not expressible by a finite fraction. The word *ratio*, or its equivalent λόγος, does not here mean reason, in the common sense of the word, but mathematical proportion. A quantity whose proportion to the unit of quantity cannot be expressed arithmetically, that is, by a whole number, or a fraction, is 'inexpressible by an arithmetical ratio,' or 'arithmetically irrational,' abbreviated into

'irrational.' This explanation is very important, since the student might otherwise be led to suppose that irrational meant unreasonable, or absurd. Suppose for example that we have a geometrical problem which we solve by the application of arithmetic, taking a certain line to be one, and applying the fundamental principles explained in RECTANGLE. Suppose the problem thus reducible to the solution of $x^2 = 2$, or the quantity sought is such a fraction as multiplied by itself will give 2. The arithmetical answer is very simple; there is no such fraction. But is the problem therefore impossible? By no means; for the line required must be the diagonal of a square whose side is the linear unit. What then is the reason for our not being able to produce an arithmetical solution? Because the ratio of the line sought to the linear unit given is not to be expressed arithmetically, or is in the preceding sense irrational. The student has now arrived at the point where he must be taught (if he have not learnt it before) that arithmetic is not the science of all ratios or relative magnitudes, but only of the ratios or relative magnitudes of those quantities which are made by putting together quantities which are all equal to one another. The senses alone would never make this distinction, and those who desire nothing more than sensible evidence in their mathematical studies need not attend to it: unfortunately the present bent of such pursuits tends to inexactness, not explicitly avowed, but wearing the appearance of absolute rigor.

The student who begins to extract the square root of numbers is allowed to place the symbol of that process over numbers which do not admit of its performance, as $\sqrt{2}$, $\sqrt{3}$, &c. These symbols are reasoned on as if they represented fractions, and arithmetical deductions are drawn: but when it is required to reduce them to practice, then the possibility of determining their arithmetical values is denied, and it is implied that they have an existence which can only be approximately represented. Thus, since 1·4142 multiplied by itself gives 2 very nearly; it is said that 1·4142 is very nearly the square root of 2. This method, which is indispensably necessary in practice, should not be allowed in perfectly strict reasoning. It cannot be just to say that 2 has no square root, but that since fractions very near to 2 have square roots, therefore these square roots are very near to the non-existent square root of 2. It is only in a properly extended arithmetic, which by express agreement admits of extended symbols of ratio, that it can be lawful to speak of the square root of 2. [RATIO.] Waiving this point for the present, we proceed to further considerations, confining ourselves to those irrational quantities which arise from taking the square roots of numbers, but premising that similar remarks might be made on cube, fourth, &c. roots. If we take the series of numbers 1, 2, 3, &c., and extract the square root of each, we thereby obtain (1.) the original series 1, 2, 3, &c., by means of $\sqrt{1}$, $\sqrt{4}$, $\sqrt{9}$, &c.; (2.) a series of multiples of $\sqrt{2}$, namely, $\sqrt{2}$, $\sqrt{8}$, $\sqrt{18}$, &c., which are $\sqrt{2}$, $2\sqrt{2}$, $3\sqrt{2}$, &c.; (3.) a similar series of multiples of $\sqrt{3}$; and so on ad infinitum. The primitive numbers are either prime numbers or products of *different* prime numbers. Thus we have a series of multiples of $\sqrt{(7 \times 5)}$, but not of $\sqrt{(7 \times 7 \times 5)}$, since this last is $7\sqrt{5}$, and, with its multiples, is included in those of $\sqrt{5}$. Any two quantities in the same series are commensurables; thus $7\sqrt{10}$ and $12\sqrt{10}$ are in the proportion of 7 to 10, and have $\sqrt{10}$ for a common measure: but any two which are in different series are incommensurables; thus $\sqrt{10}$ and $\sqrt{11}$ have no common measure whatsoever. And the sum or difference of any two incommensurable quantities is incommensurable with either; thus we can form infinite sets of binomials, such as $\sqrt{2}+\sqrt{3}$, $\sqrt{10}+\sqrt{11}$, $\sqrt{19}-\sqrt{5}$, &c., no one of which shall be commensurable with any other.

The square root of any arithmetical fraction is commensurable with that of the product of its numerator and denominator: thus $\sqrt{(\frac{3}{5})}$ is $\frac{1}{5}\sqrt{15}$. And the reciprocal of any square root is commensurable with that square root: thus $1 \div \sqrt{7}$ is $\frac{1}{7}\sqrt{7}$. Also the fraction made by any two of the binomials just described is commensurable with the product of some similar pair: thus

$$\frac{\sqrt{3}+\sqrt{5}}{\sqrt{10}-2} = \tfrac{1}{6}(\sqrt{3}+\sqrt{5})(\sqrt{10}+2).$$

If we take the square root of one of the preceding binomials, as $\sqrt{(\sqrt{3}+\sqrt{5})}$ we have a new quantity, not commensurable with any of those just mentioned, except only in certain cases pointed out by the following theorem. Let a and b be two numbers, of which a is the greater:

$$\sqrt{(\sqrt{a} \pm \sqrt{b})} =$$

$$\sqrt{\left(\frac{\sqrt{a}+\sqrt{(a-b)}}{2}\right)} \pm \sqrt{\left(\frac{\sqrt{a}-\sqrt{(a-b)}}{2}\right)}$$

If a and $a-b$ be both square numbers, let $a = p^2$, $a-b = q^2$, and we have

$$\sqrt{(\sqrt{a} \pm \sqrt{b})} = \tfrac{1}{2}\sqrt{(2p+2q)} \pm \tfrac{1}{2}\sqrt{(2p-2q)}.$$

Though Euclid was not acquainted with any direct algebraical process, yet he carried the distinction of incommensurable quantities to the length of a complete subdivision of all the possible cases which can be contained in the formula $\sqrt{(\sqrt{a} \pm \sqrt{b})}$. We are induced to give an account of his tenth book, because there does not, to our knowledge, exist any such thing in a form accessible to the student. Indeed, we do not know where to find a description of its details in any form whatsoever. In old geometrical writings references to the classification of this book are not unfrequently met with. If we take any given line to represent the unit of length, and if a, b, c, &c., represent lines commensurable with this unit, arithmetically expressed, it is well known that the most common geometry shows how to find the lines expressed by $\sqrt{a}$, $\sqrt{b}$, &c. All such lines Euclid terms rational, all others irrational (ῥητός and ἄλογος); and any area which being formed into a square has a rational side, he calls a rational area; that is in fact any area which is commensurable (σύμμετρος) with the square unit, is rational. The term for the square on a line is its *power* (δύναμις) and from this comes the algebraical use of the word power. Thus when he says that two lines are only commensurable in power, he means that the squares on them are commensurable, but not the lines themselves. A mean, or medial line (μέσος), is the mean proportional between two incommensurable rational lines, and is such as can be represented in algebra by $\sqrt[4]{a}$, where a is commensurable with the unit: and a medial area is the mean proportional between two rational areas, and its number of square units may be represented by $\sqrt{a}$.

A line which is made by putting together (σύνθεσις) two incommensurable rational lines is called a line of two names (ἐκ δύο ὀνομάτων), or a binomial line; while one which is made by taking away (ἀφαίρεσις) the lesser of two incommensurable rational lines from the greater, is called an apotomé (ἀποτομή) literally, off-cut. The binomial therefore has one of the forms $a+\sqrt{b}$ and $\sqrt{a}+\sqrt{b}$, while the apotomé has one of the forms $\sqrt{a}-\sqrt{b}$, $a-\sqrt{b}$, $\sqrt{b}-a$. Six distinct species of each sort of line are found, and in connection with each set of six is another similar set, which a modern mathematician would describe as composed of the square roots of the first set. But Euclid describes the square roots, as we should call them, previously to the lines themselves, and in order to render this article more available to those who look through the tenth book, we shall do the same. The whole amounts to this, that taking a given line as the unit and standard, Euclid separates the lines represented by $\sqrt{(\sqrt{a} \pm \sqrt{b})}$, where a and b are commensurable with the standard unit, into twenty-five distinct classes, no one of which contains any lines commensurable with those of any other class. The following enumeration contains the order in which they make their appearance: a, b, &c., representing lines commensurable with the standard unit; A, B, C, D, E, F, the six binomial lines; $\sqrt{A}$, $\sqrt{B}$, &c., those connected with them; U, V, W, X, Y, Z, the six apotomæ; $\sqrt{U}$, $\sqrt{V}$, &c., those connected with them.

It is however to be noticed that Euclid does not use the term unit, but supposes a rational line, to which he makes reference. Thus when he mentions in one place a rational line and a fourth binomial, he means that the fourth binomial shall be related to that rational line in the same manner as our following definition will connect it with the modern phrase, the standard unit.

(1). a, b, &c., lines commensurable with the unit.

(2). $\sqrt{a}$, $\sqrt{b}$, &c., lines commensurable in power with the unit. These two heads include the rational lines.

(3). $\sqrt[4]{a}$, $\sqrt[4]{b}$, &c., medial lines, described by Euclid as lines equal in power to the rectangle of incommensurable rational lines.

( ). $\sqrt{A}$ has the form $\sqrt{a}+\sqrt{b}$. A binomial line generally. This case contains all the six hereafter described and numbered, for which reason the numbering is here left blank. There is a proposition which we should now enunciate by saying that the square root of a binomial of the first species

(A) is one or other, and may be either, of the six binomials.

(4). $\sqrt{B}$ has the form $(\sqrt{a}+\sqrt{b})\sqrt[4]{x}$, where abx is a square number. It is the first species of line composed of two medials, or a first bi-medial, and is compounded of two medials, which make a rational rectangle (εὐθεῖα ἐκ δύο μέσων πρώτη).

(5). $\sqrt{C}$ has the form $(\sqrt{a}+\sqrt{b})\sqrt[4]{x}$, where abx is not a square number. It is the second species of line composed of two medials, or a second bi-medial, and is compounded of two medial lines, which make a medial rectangle (εὐθεῖα ἐκ δύο μέσων δευτέρα).

(6). $\sqrt{D}$ has the form $\sqrt{(a+\sqrt{b})}+\sqrt{(a-\sqrt{b})}$, where a^2-b is not a square. It is described by Euclid as composed of two straight lines, incommensurable in power, whose squares together make a rational space, but whose rectangle is a medial space, and is called by him a greater line (εὐθεῖα μείζων).

(7). $\sqrt{E}$ has the form $\sqrt{(\sqrt{a}+\sqrt{b})}+\sqrt{(\sqrt{a}-\sqrt{b})}$, where $a-b$ is a square. It is described by Euclid as composed of two straight lines incommensurable in power, whose squares together make a medial space, but whose rectangle is a rational space; and it is called by him 'a line in power making a rational and a medial space' (εὐθεῖα ῥητὸν καὶ μέσον δυναμένη). The nomenclature is not here quite correct, for the preceding line, called a greater line, is also a line in power equal to a rational and medial space.

(8). $\sqrt{F}$ has the form $\sqrt{(\sqrt{a}+\sqrt{b})}+\sqrt{(\sqrt{a}-\sqrt{b})}$, where $a-b$ is not a square. It is described by Euclid as composed of two lines incommensurable in power, making both the sum of their squares and their rectangle medial spaces incommensurable with one another; and it is called 'a line in power equal to two medial spaces' (εὐθεῖα δύο μέσα δυναμένη).

We now come to the description of the six binomial lines themselves.

(9). A has the form $a+b+2\sqrt{(ab)}$. It is described by Euclid as having the greater term commensurable with the standard unit, and more in power than the less by the square of a line commensurable with itself in length; and it is called the first binomial line (εὐθεῖα ἐκ δύο ὀνομάτων πρώτη).

(10). B has the form $(a+b+2\sqrt{(ab)})\sqrt{x}$, where abx is a square. It is described as differing from the first binomial only in having the lesser term commensurable with the standard unit; and is the second binomial line.

(11). C has the form $(a+b+2\sqrt{(ab)})\sqrt{x}$, where abx is not a square. It differs from the two preceding only in neither term being commensurable with the standard unit.

In the first three binomial lines, reduced to the form $\sqrt{p}+\sqrt{q}$, $\sqrt{(p-q)}$ is commensurable with $\sqrt{p}$, the greater term: in the last three these two are incommensurable.

(12). D has the form $a+\sqrt{b}$, where a is greater than $\sqrt{b}$, and a^2-b is not a square. Euclid describes it as having the greater term more in power than the less by the square of a line incommensurable to itself in length, the same greater term being commensurable with the standard unit: it is the fourth binomial line.

(13). E has the form $a+\sqrt{b}$, where $\sqrt{b}$ is greater than a, and $b-a^2$ is not a square. It is described as differing from the preceding by having the less term commensurable with the standard unit: it is the fifth binomial line.

(14). F has the form $\sqrt{a}+\sqrt{b}$ where $a-b$ is not a square. It is described as differing from the two preceding by neither term being commensurable with the standard unit; and is the sixth binomial line.

We now come to the lines derived from the apotomæ, and afterwards to the apotomæ themselves. The descriptions might be shortened by allusion to the corresponding binomial lines, but this would impede the speedy reference to the complete meaning of any one term.

( ). $\sqrt{U}$ has the form $\sqrt{a}-\sqrt{b}$. An apotomé generally. The numbering is left blank, as this class of lines is afterwards subdivided. A proposition is proved, which we should now enunciate by saying that the square root of an apotomé of the first kind is one or other, and may be any of the six apotomæ.

(15). $\sqrt{V}$ has the form $(\sqrt{a}-\sqrt{b})\sqrt[4]{x}$ where abx is a square. Euclid describes it as the difference of two medial lines which are commensurable in power, and whose rectangle is a rational space. He calls it the first kind of apotomé of a medial line (μέσης ἀποτομὴ πρώτη).

(16). $\sqrt{W}$ has the form $(\sqrt{a}-\sqrt{b})\sqrt[4]{x}$, where abx is not a square. It is described as differing from the former only in the medial lines containing a medial space, and is the second apotomé of a medial line.

(17). $\sqrt{X}$ has the form $\sqrt{(a+\sqrt{b})}-\sqrt{(a-\sqrt{b})}$ where a^2-b is not a square. Euclid describes it as the difference of two straight lines incommensurable in power, the sum of whose squares is rational, and their rectangle medial: and he calls it a lesser line (εὐθεῖα ἐλάσσων).

(18). $\sqrt{Y}$ has the form $\sqrt{(\sqrt{a}+\sqrt{b})}-\sqrt{(\sqrt{a}-\sqrt{b})}$ where $a-b$ is a square. It is described as the preceding, except that the sum of the squares is medial, and the rectangle rational: and Euclid calls it 'a line which with a rational space makes a medial space' (εὐθεῖα μετὰ ῥητοῦ μέσον τὸ ὅλον ποιοῦσα) meaning that a certain rational space added to the square on it makes a whole space, which is medial. There is not here the defect of nomenclature mentioned in (7), for the preceding line here can only be called 'a line which with a medial space makes a rational space.'

(19). $\sqrt{Z}$ has the form $\sqrt{(\sqrt{a}+\sqrt{b})}-\sqrt{(\sqrt{a}-\sqrt{b})}$ where $a-b$ is not a square. It is described by Euclid as the difference of two lines incommensurable in power, having the sum of their squares and their rectangle both medial: and it is called 'a line which with a medial space makes a medial space (εὐθεῖα μετὰ μέσου μέσον τὸ ὅλον ποιοῦσα).

The six apotomæ now follow, all in the form $\sqrt{a}-\sqrt{b}$; in the first three $\sqrt{(a-b)}$ is commensurable with $\sqrt{a}$, in the second three, incommensurable. And $\sqrt{a}$ is called the whole, but $\sqrt{b}$ is called the fitted or adapted line.

(20). U has the form $a+b-2\sqrt{(ab)}$. The whole is commensurable with the standard unit, and exceeds it the adapted line in power by the square of a line commensurable to itself. Euclid calls this a first apotomé.

(21). V has the form $(a+b-2\sqrt{(ab)})\sqrt{x}$ where abx is a square. Described as the preceding, except that only the adapted line is commensurable with the standard unit; and is the second apotomé.

(22). W has the form $(a+b-2\sqrt{(ab)})\sqrt{x}$, where abx is not a square. Here neither the whole nor the adapted line is commensurable with the standard unit; this is the third apotomé.

(23). X has the form $a-\sqrt{b}$ where a^2-b is not a square. Euclid describes it by saying that the whole is commensurable with the standard unit, and exceeds the adapted line in power by the square of a line incommensurable with itself; and calls it the fourth apotomé.

(24). Y has the form $\sqrt{b}-a$ where $b-a^2$ is not a square. Described as the last, excepting that only the adapted line is commensurable with the standard unit: it is the fifth apotomé.

(25). Z has the form $\sqrt{b}-\sqrt{a}$ where $b-a$ is not a square. It differs from the two preceding by neither term being commensurable with the standard unit: and is the sixth apotomé.

Besides obtaining this classification, Euclid proves, firstly, that every one of these species is distinct from every other, and that every line which is commensurable with a line of any one species is itself a line of the same species. He shows also how to find lines of every species, in which he directly applies the theory of numbers obtained in the seventh, eighth, and ninth books. He also demonstrates that no straight line can belong to one species in two different ways: proving, for example, an equivalent to the following, that $\sqrt{a}+\sqrt{b}$, if the terms be incommensurable, cannot be equal to $\sqrt{x}+\sqrt{y}$, where x differs from a, and y from b: which he expresses thus:—'a binomial line is divided into its names (or terms) in one point only.' He then proves that the lines which we have denoted by $\sqrt{A}$, $\sqrt{B}$, &c., are derived from A, B, &c., in the manner which justifies our notation. For instance, 'if a space be contained by a rational and a fourth binomial line, the line equal in power to the space is the irrational line called a greater line.' Now, c representing a rational line, a fourth binomial derived from it has the form $a+\sqrt{b}$ where a is commensurable with c, and greater than $\sqrt{b}$, and $\sqrt{(a^2-b)}$ is not commensurable with c. His proposition then amounts to this, that $\sqrt{(ca+c\sqrt{b})}$ has the form

$$\sqrt{(x+\sqrt{y})}+\sqrt{(x-\sqrt{y})}$$

where $2x$ is a rational space (or the number $2x$ commensurable with c^2), and x^2-y is an irrational space, or that number is incommensurable with c^2. This involves the algebraical proposition, that the square root of $ca+c\sqrt{b}$ is

$$\sqrt{\{\tfrac{1}{2}ca+\tfrac{1}{2}c\sqrt{(a^2-b)}\}}+\sqrt{\{\tfrac{1}{2}ca-\tfrac{1}{2}c\sqrt{(a^2-b)}\}};$$

and in showing the identity of the forms, Euclid arrives at the manner of deriving one from the other. He also shows, in two propositions, that the form $\sqrt{(a+\sqrt{b})}$ gives either a binomial line, or (4), (6), or (7) of the preceding enumeration, and that $\sqrt{(\sqrt{a}+\sqrt{b})}$ gives either (5) or (8). In three more he shows that $\sqrt{(a-\sqrt{b})}$ gives either an apotomé or (17) of the enumeration, that $\sqrt{(\sqrt{b}-a)}$ gives either (15) or (18), and that $\sqrt{(\sqrt{a}-\sqrt{b})}$ gives either (16) or (19). He further shows the equivalent of the following algebraical proposition:—

$$\frac{1}{\sqrt{a}-\sqrt{b}}=\frac{\sqrt{a}+\sqrt{b}}{a-b}$$

The preceding enumeration points to one of the most remarkable pages in the history of geometry. The question immediately arises, had Euclid any substitute for algebra? If not, how did he contrive to pick out, from among an infinite number of orders of incommensurable lines, the whole, and no more than the whole, of those which were necessary to a complete discussion of all lines represented by $\sqrt{(\sqrt{a}\pm\sqrt{b})}$, without one omission or one redundancy? He had the power of selection, for he himself has shown how to construct an infinite number of other species, and an algebraist could easily point out many more ways of adding to the subject, which could not have been beyond Euclid. If it be said that a particular class of geometrical questions, involving the preceding formula and that one only, pointed out the various cases, it may be answered that no such completeness appears in the thirteenth book, in which Euclid applies his theory of incommensurables. It is there proved that each of the segments of a line divided in extreme and mean ratio is an apotomé—that the side of an equilateral pentagon inscribed in a circle is, relatively to the radius, the irrational line called a lesser line, as is also the side of an icosahedron inscribed in a sphere—and that the side of a dodecahedron is an apotomé. The apotomé then and the lesser line are the only ones applied.

It seems probable that the distinction of commensurable and incommensurable, and even a notion of different species of incommensurables, was familiar to the geometer before Euclid wrote. Had it been otherwise, we must suppose that the definitions of the fifth book would have been accompanied by some little account of their necessity, and also that the absolute determination of two incommensurable magnitudes would not have been postponed till the last proposition of the tenth book. But it is impossible to draw any very positive conclusion on this subject. Owing to the loss of Euclid's book on Fallacies [GEOMETRY, p. 162], we are probably left without those notions which he intended to be preliminary to the elements.

The most conspicuous propositions of elementary geometry which are applied in the tenth book are the 27th, 28th, and 29th of the sixth book, of which it may be useful to give the algebraical signification. The first of these (the 27th) amounts to showing that $2x-x^2$ has its greatest value when $x=1$, and contains a limitation necessary to the conditions of the two which follow. The 28th proposition is a solution of the equation $ax-x^2=b$, upon a condition derived from the preceding proposition, namely, that $\frac{1}{4}a^2$ shall exceed b. It might appear more correct to say that the solution of this equation is one particular case of the proposition, namely, where the given parallelogram is a square; but nevertheless the assertion applies equally to all cases. Euclid however did not detect the *two* solutions of the question; though if the diagonal of a parallelogram in his construction be produced to meet the production of a line which it does not cut, the second solution may be readily obtained. This is a strong presumption against his having anything like algebra; since it is almost impossible to imagine that the propositions of the tenth book, deduced from any algebra, however imperfect, could have been put together without the discovery of the second root. The remaining proposition (the 29th) is equivalent to a solution of $ax+x^2=b$: but the case of $x^2-ax=b$ is wanting, which is another argument against Euclid having known any algebraical reasoning.

IRRAWADDI. [BIRMAN EMPIRE.]

IRREDUCIBLE CASE (that is, of cubic equations), the common name of a particular class of cubic equations, to which Cardan did not succeed in applying his celebrated rule. Bombelli however showed that the reason of this was the reality of all the three roots. The following is the sketch both of the method and the difficulty. [BOMBELLI; CARDAN; TARTALEA; THEORY OF EQUATIONS; NEGATIVE AND IMPOSSIBLE QUANTITIES.]

Unity has three cube roots, 1, $-\frac{1}{2}(1-\sqrt{-3})$, and $-\frac{1}{2}(1+\sqrt{-3})$, of which the product of the second and third is possible and equal to unity. Calling these 1, r, and r', it is next shown that a^3 has three cube roots, namely, a, ra, and $r'a$. Now, let there be a cubic equation (A, B, and C being possible quantities)

$$x^3+Ax^2+Bx+C=0;$$

and, by the method explained in INVOLUTION AND EVOLUTION, find another equation which has each root greater than a root of the preceding by $\frac{1}{3}$A. We have then

$$x^3+Px+Q=0\ \ldots\ (1)$$
$$P=B-\tfrac{1}{3}A^2 \qquad Q=C-\tfrac{1}{3}AB+\tfrac{2}{27}A^3.$$

Let x be $v+w$: then $x^3=v^3+w^3+3vwx$, and (1) becomes

$$v^3+w^3+(3vw+P)\,x+Q=0\ \ldots\ (2).$$

Determine v and w so that

$$3vw+P=0 \qquad v^3+w^3+Q=0;$$

by which means (2), and therefore (1), is satisfied. This gives

$$v^3\ (\text{or } w^3)=-\tfrac{1}{2}Q+\sqrt{(\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3)}$$
$$w^3\ (\text{or } v^3)=-\tfrac{1}{2}Q-\sqrt{(\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3)},$$

from which v and w can be found. But as each of the two, v and w^3, has three cube roots; and as no reason yet appears for choosing one rather than another, it should seem as if the possible combinations by which $v+w$ might be made would be nine in number. But on looking back we find the condition $3vw=-P$; so that the product of v and w must be a possible quantity. If then we signify by v and w the real cube roots of v^3 and w^3, the others are rv and $r'v$, rw and $r'w$; and the only combinations which satisfy the last-mentioned condition are

$$v+w,\quad rv+r'w,\quad r'v+rw,$$

which are the three roots of the equation (1), to the exclusion of $v+rw$, $rv+w$, $v+r'w$, $r'v+w$, $rv+rw$, $r'v+r'w$. So far all is right, and the algebraical solution is complete, and may be represented thus: let ρ stand for any cube root of unity; then the three solutions of (1) are contained in

$$\rho\,\sqrt[3]{(-\tfrac{1}{2}Q+\sqrt{(\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3)})}$$
$$+\frac{1}{\rho}\sqrt[3]{(-\tfrac{1}{2}Q-\sqrt{(\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3)})},$$

where $\sqrt[3]{\ }$ signifies the real cube root.

This is perfectly intelligible when $\frac{1}{4}Q^2+\frac{1}{27}P^3$ is a positive quantity: for if we call the real cube roots above mentioned K and L, we find for the three roots of the equation, first, the possible root, $K+L$; next, the pair of impossible roots contained in the formula

$$-\tfrac{1}{2}(K+L)\pm\tfrac{1}{2}(K-L)\sqrt{-3}.$$

If we apply this to the equation $x^3-9x-28=0$, where $P=-9$, and $Q=-28$, we shall find $K=3$, $L=1$, and the roots are 4, $-2+\sqrt{-3}$, and $-2-\sqrt{-3}$. But if it should happen that $\frac{1}{4}Q^2+\frac{1}{27}P^3$ is negative (which requires that P should be negative and $\frac{1}{27}P^3$ numerically greater than $\frac{1}{4}Q^2$), we return to the original form of the solution, and find that the roots of the equation are contained in the formula

$$\left\{V+W\sqrt{-1}\right\}^{\frac{1}{3}}+\left\{V-W\sqrt{-1}\right\}^{\frac{1}{3}}\ \ldots\ (3)$$

where $\{\ \}^{\frac{1}{3}}$ means any cube root, there being a tacit condition that the product of the two cube roots must be possible. V stands for $-\frac{1}{2}Q$, and W for the possible (though perhaps irrational) quantity $\sqrt{(-\frac{1}{4}Q^2-\frac{1}{27}P^3)}$. Now, it is shown in books of algebra that every cube root of $V+W\sqrt{-1}$ is of the same form, say $F+G\sqrt{-1}$, and that the corresponding cube root of $V-W\sqrt{-1}$ is $F-G\sqrt{-1}$. If then we assume

$$\left\{V+W\sqrt{-1}\right\}^{\frac{1}{3}}=F+G\sqrt{-1},$$
$$\left\{V-W\sqrt{-1}\right\}^{\frac{1}{3}}=F-G\sqrt{-1},$$

we find by multiplication

$$\left\{V^2+W^2\right\}^{\frac{1}{3}}=F^2+G^2;$$

and by addition of their cubes, and division by 2,

$$V=F^3-3FG^2,$$

between which the elimination of G gives

$$F^3 - \tfrac{3}{4} \sqrt[3]{V^2+W^2} \,.\, F - \tfrac{1}{4}V = 0;$$

from which it would seem that we might find F, and then G. But on examining this last equation we find it to be precisely that kind of cubic equation about which the difficulty arose; for the P of this equation is negative, being $-\frac{3}{4}\sqrt[3]{(V^2+W^2)}$, and the Q is $-\frac{1}{4}V$; and $\frac{1}{27}P^3$, being $-\frac{1}{64}(V^2+W^2)$, is numerically greater than $\frac{1}{4}Q^2$, or $\frac{1}{64}V^2$. Whence this case is called irreducible; for though, as will be shown immediately, there are three possible values of the expression (3), yet every direct algebraical attempt to find them leads to the same difficulty in another form.

If F and G could be determined, one value of (3) is 2 F; and taking the other cube roots, selecting only those pairs whose products are possible, we find

$$-\tfrac{1}{2}(1+\sqrt{-3})\ (F+G\sqrt{-1})\ -\tfrac{1}{2}(1-\sqrt{-3})\ (F-G\sqrt{-1})$$
$$-\tfrac{1}{2}(1-\sqrt{-3})\ (F+G\sqrt{-1})\ -\tfrac{1}{2}(1+\sqrt{-3})\ (F-G\sqrt{-1})$$

for the other admissible values. These may be reduced to

$$-F+G\sqrt{3}, \text{ and } -F-G\sqrt{3},$$

which are both possible. Consequently, the irreducible case of a cubic equation is that in which the three roots are all possible.

Let us apply the preceding to $x^3 - 21x + 20 = 0$. Here $P = -21$, $Q = 20$, $\frac{1}{4}Q^2 + \frac{1}{27}P^3 = -243 = -81 \times 3$. Hence the roots are contained in

$$\left\{-10+9\sqrt{3}\sqrt{-1}\right\}^{\frac{1}{3}} + \left\{-10-9\sqrt{3}\sqrt{-1}\right\}^{\frac{1}{3}}.$$

By trial (or by semi-tentative methods, described in most books of algebra) it may be found that a cube root of $-10+9\sqrt{3}\sqrt{-1}$ is $2+\sqrt{3}\sqrt{-1}$; whence $F=2$, $G=\sqrt{3}$. Hence one root (2 F) is 4; the second and third ($-F+G\sqrt{3}$ and $-F-G\sqrt{3}$), are $-2+3$ and $-2-3$, or 1 and -5.

But the best method of obtaining the roots is by having recourse to a registry of the roots of cubic equations, which is in the hands of every tyro, namely, the tables of sines and cosines, by which also the theorem of Bombelli will be established, namely, that the difficulty of the irreducible case answers to that of the trisection of an angle in geometry. It is proposed then, by means of trigonometry, to calculate the values of (3). Assume $V = r \cos.\theta$, $W = r \sin.\theta$, or find r and θ from

$$r = \sqrt{V^2+W^2}, \qquad \tan.\theta = \frac{W}{V}$$

in which that sign must be given to r, which gives $r \cos.\theta$ the sign of V. Then, by De Moivre's theorem [NEGATIVE AND IMPOSSIBLE QUANTITIES],

$$(\cos.\theta \pm \sin\theta\sqrt{-1})^{\frac{1}{3}} = \cos.\tfrac{1}{3}\theta \pm \sin.\tfrac{1}{3}\theta\sqrt{-1},$$

in which, by substituting $\theta+360°$ or $\theta+720°$ for θ, the equation $\tan.\theta = V \div W$ is still satisfied, and while the first side of the preceding equation is not altered in appearance, the different values of the cube root appear on the second side. From this we readily find that the expression (3) is no other than $2\sqrt[3]{r}\,.\cos.\frac{1}{3}\theta$; the three values of which, obtained as just noted, are

$$2\sqrt[3]{r}\,.\cos.\tfrac{1}{3}\theta,\ 2\sqrt[3]{r}\cos.(120°+\tfrac{1}{3}\theta),\ 2\sqrt[3]{r}\cos.(240°+\tfrac{1}{3}\theta)$$

which may be thus written:

$$2\sqrt[3]{r}\,.\cos.\tfrac{1}{3}\theta,\ -2\sqrt[3]{r}\,.\cos.(60°-\tfrac{1}{3}\theta),\ -2\sqrt[3]{r}\,.\cos.(60°+\tfrac{1}{3}\theta.)$$

Thus, in the preceding example, which gives $V=-10$, $W=9\sqrt{3}$, we find $r^2=100+243=343=7$; whence $\sqrt[3]{r} = -\sqrt{7}$. And $\tan.\theta = -\frac{9}{10}\sqrt{3}$, whence θ is found to be $-(57° 19' 16'')$, one-third of which is $-(19° 6' 25'')$, and this, with $79° 6' 25''$ and $40° 53' 35''$, are the angles on which the required values depend. The cosines of these angles, severally multiplied by $-2\sqrt{7}$, $2\sqrt{7}$, and $2\sqrt{7}$, give results as near to -5, 1, and 4 (the values found), as the unavoidable errors in the last places of logarithmic results, and the preceding rejection of fractions of seconds, will permit.

IRRIGATION. Of all the substances which concur in the vegetation and growth of plants water is the most essential: without moisture the seed cannot germinate, nor can the plant receive nourishment. Hence in warm climates, where rains are periodical, and where the soil is dried and parched by a continued evaporation, no verdure exists, except where springs or rivers supply the waste of moisture. The warmer the climate, and the more rapid the evaporation, the more luxuriant is the vegetation, provided there be an abundant supply of water. This circumstance has suggested the plan of diverting streams and conducting them in channels to fertilize as great an extent of land as possible. In China and in India, as well as in Egypt, ingenious modes of watering lands have been adopted from the most remote ages. No expense has been thought too great to secure a supply of water, and to distribute it in the most advantageous manner. It seems that where there is great heat in the air, water alone will supply the necessary food for the growth of plants. It is probable that the component parts of the atmosphere are more easily separated, and made to enter into new combinations with those of water, in a high temperature than in a lower; or that the leaves and green parts of vegetables imbibe water in a state of solution in air, and that in this state it is more easily decomposed. Atmospheric air and water contain all the principal elements of vegetables, viz. oxygen, hydrogen, carbon, and nitrogen: the remainder are either found in the soil or diffused through the water. Manures seem to act principally as stimulants or re-agents, and are themselves composed of the same elements: they are of no use unless diffused or dissolved in water; but when the water is impregnated with animal or vegetable substances, the effect is far greater and more rapid than when the water is pure.

Water has also an important office to perform, if we admit the principle discovered by Macaire, that plants reject through their roots those portions of the sap which are the residue of its elaboration, and which are of no further use to the plant, but rather injurious if they are again imbibed by the roots. Plants seem to require a removal of their excrements, as animals do when tied up in stalls, or confined in a small space. If this is not effected, they suffer and contract diseases. The percolation of water through the soil is the means which nature has provided for this purpose. Hence we can readily suppose that the mere washing of the roots has a beneficial effect, and to this in a great measure must be ascribed the fertilizing effects of pure and soft running water.

If water stagnates and is evaporated, and the noxious matter held in solution remains in the soil, all the advantage of irrigation is lost, and the better kinds of grasses are succeeded by rushes and coarse aquatic plants, as may be seen in all marshy spots. The circulation of the water therefore appears to be as necessary as its presence; and, provided there be a sufficient supply of water of a proper quality, the more porous the soil, and especially the subsoil, is, the more vigorous is the vegetation. It is on this principle alone that we can rationally account for the great advantage of irrigation in those climates where rain is abundant, and where the soil, which is most benefited by having a supply of water running through it, is of a nature to require artificial draining as an indispensable preliminary to being made fertile by irrigation. By keeping these principles in view great light will be thrown on the practical part of irrigation, which, having been long established by experience before these principles were thought of, depends not on their correctness, but only confirms their truth.

The whole art of irrigation may be deduced from two simple rules, which are, first, to give a sufficient supply of water during all the time the plants are growing, and secondly, never to allow it to accumulate so long as to stagnate. We shall see hereafter one apparent exception to this last rule, but it will be readily explained.

The supply of water must come from natural lakes and rivers, or from artificial wells and ponds, in which it is collected in sufficient quantity to disperse it over a certain surface. As the water must flow over the land, or in channels through it, the supply must be above the level of the land to be irrigated. This is generally the principal object to be considered. If no water can be conducted to a reservoir above the level of the land, it cannot be irrigated. But there must also be a ready exit for the water, and therefore the land must not be so low as the natural level of the common receptacle of the waters, whether it be a lake or the sea, to which they run. The taking of the level is therefore the first step towards an attempt to irrigate any lands.

Along the banks of running streams nature points out the declivity. A channel, which receives the water at a point higher than that to which the river flows, may be dug with a much smaller declivity than that of the bed of the river, and made to carry the water much higher than the natural banks. It may thence be distributed so as to descend slowly and water a considerable extent of ground in its way to rejoin the stream. This is by far the most common mode of irrigation, and the shape, size, and direction

of the channels are regulated by the nature of the surface and other circumstances, which vary in almost every situation. A few examples will give to those who are not acquainted with the best modes of irrigating land a pretty accurate notion of the system.

We shall suppose a river to run with a rapid current between high banks. At some point of its course a portion of the water is diverted into a canal dug along the bank, with a very small declivity. The water in this canal will flow with less rapidity than the river, but will keep the same level as that part of the river where it has its origin. Thus the water may be carried over lands which are situated considerably above the bed of the river farther down. All the lands between this canal and the river may be irrigated if there is a sufficient supply of water. The canal may be carried to a considerable distance from the river. The size of the canal and its declivity depend on the quantity of water which may be made to flow into it. A dam is often constructed across a river, in order that as much of its water as is possible may be diverted, and the original channel is often laid quite dry, to take advantage of all the water at the time when it is advantageous to irrigate the land. To have an entire command of the water there are flood-gates on the main channel and on the lesser branches. By opening or shutting these the water may be stopped or made to flow as may be required. It must be remembered, that to carry water to a considerable distance, and in great quantity, a larger channel and more rapid declivity are required; and it is a matter of calculation whether it is most advantageous to bring a smaller quantity to a higher point, or a greater abundance somewhat lower. Having a certain command of water, it may be carried from the main channel by smaller branches to different points, so as to irrigate the whole equally. These branches should be nearly horizontal, that the water may overflow the sides of them, and be equally distributed over the land immediately below. Every branch which brings water over the land should have a corresponding channel below to carry it off; for the water must never be allowed to stop and stagnate. When it has run 15 or 20 feet, according to the declivity, over the land situated below the *feeder*, or the channel which brings the water, it should be collected into a drain to be carried off, unless it can be used to irrigate lands which lie still lower. Finally it runs back into the river from which it was taken, at a lower point of its course.

When there is a considerable fall and a sufficient supply of water, a series of channels may be made, so situated below each other, that the second collects the water which the first has supplied, and in its turn becomes a feeder to irrigate the lower parts of the declivity: a third channel receives the water and distributes it lower down, until the last pours it into the river. This is called *catch work*, because the water is caught from one channel to another. This method is only applicable where there is a considerable fall of water and a gentle declivity towards the river. But it must be borne in mind that the water is deteriorated for the purpose of irrigation, when it has passed over the land, and that it is not advantageous to let it flow over a great extent when a fresh supply can be obtained: but where only a small portion of water can be commanded, that must be made the most of; and it will irrigate three or four portions of land in succession without there being any very marked difference in the effect: beyond this it rapidly loses its fertilizing qualities. This is not owing to the water having deposited the fertilizing substances which it held in solution, or which were diffused through it, but it is owing to its having taken up some which are detrimental to vegetation, and being saturated with them: at least this is the most probable opinion when all circumstances are taken into the account.

The general principle of irrigation may be described as the supplying every portion of the surface with an abundance of water, and taking it off again rapidly. In many situations the great difficulty in irrigation arises from the want of a supply of water; but even then a partial irrigation may be effected, which, although not perfect, will have its advantages. A small rill which is often quite dry in summer may still, by judicious management, be made to improve a considerable portion of land: its waters may be collected and allowed to accumulate in a pond or reservoir, and let out occasionally, so that none be lost or run to waste. If there is but a small quantity it must be husbanded and made to flow over as great a surface as possible. If there is water only at particular seasons of the year, and at a time when it would not be of much use to the land, it may be kept in ponds, and it will lose none of its qualities by being exposed to the air. If animal or vegetable matter in a partial state of decomposition is added to this water, it will much improve its quality, and by a judicious distribution of it over the land a great benefit may be obtained.

If there is not a want of water, there may be a want of declivity to enable it to flow off, which, it should always be remembered, is an essential part of irrigation. Art may in this case assist nature by forming a passage for the water, either in its course towards the land to be irrigated, or from it after it has effected its purpose. Where there is no natural exit, and it might lead to too great an expense to make an artificial one, the water may sometimes be led into shallow ponds, where a great part is evaporated; or porous strata may be found by boring, into which it can be made to run and be dispersed. Along rivers where the fall is very imperceptible a channel brought from a considerable distance may give such a command as to throw the water over a great extent of surface; and to carry it off another channel may be cut, emptying itself at some distance below: so that lands which lie along the banks of a river may be irrigated, although they are actually below the level of the river, and require banks to protect them from inundation.

When the surface to be irrigated is very flat and nearly level, it is necessary to form artificial slopes for the water to run over. The whole of the ground is laid in broad beds, undulating like the waves of the sea. The upper part of these beds is quite level from end to end, and here the channel or float which brings the water on is cut. From the edge of this channel the ground is made to slope a foot or two on both sides, and a ditch is cut at the bottom parallel to the float. The whole of the ground is laid out in these beds. All the floats are supplied by a main channel at right angles to the beds, and somewhat above them, and all the ditches or drains run into a main ditch parallel to the main float, and below the lowest drain. The course of the water is very regular. As soon as the flood gates are opened it flows into all the upper channels, which it fills till they overflow in their whole length. The sloping sides are covered with a thin sheet of running water, which the lower drains collect and carry into the main ditch.

Experience has shown that there are particular seasons when the water has the best effect; a perfect command of it is therefore indispensable, and also a regular supply. During frost, when all dry meadows are in a state of torpor, and the vegetation is suspended, the water-meadows, having a current of water continually flowing over them, are protected from the effect of frost, and the grass will continue to grow as long as the water flows over it. Too much moisture however would be injurious, and the meadows are therefore laid dry by shutting the flood-gates, whenever the temperature of the air is above freezing. By this management the grass grows rapidly at the first sign of spring. Before the dry upland meadows have recovered the effects of frost and begun to vegetate, the herbage of the water-meadows is already luxuriant. As soon as they are fed off or cut for the first crop of hay, the water is immediately put on again, but for a shorter time; for the warmer the air, the less time will the grass bear to be covered with water. A renewed growth soon appears, and the grass is ready to be cut a second time when the dry meadows only give their first crop. Thus, by judicious management, three or four crops of grass are obtained in each season, or only one abundant crop is made into hay, and the sheep and cattle feed off the others. The usual way in which the grass of water-meadows is made profitable is by feeding ewes which have early lambs till the middle of April. A short flooding soon reproduces a crop, which is mown for hay in June; another flooding gives an abundant aftermath, which is either mown for hay, or fed off by cows, bullocks, and horses; for at this time the sheep, if pastured in water-meadows, are very subject to the rot. The value of good water-meadows could scarcely be believed by those who are not familiar with them. Where the water is suited to irrigation they never require manuring. Their fertility is kept up continually, and the only attention required is to weed out coarse aquatic plants, which are neither nutritious nor wholesome in hay or pasture.

The best soil for a water-meadow is a good gravel. The finest water-meadows on the Avon in Wiltshire, where the richest herbage is found, have scarcely any soil at all, but are on a bed of shingle and pebbles matted together by the

roots of the grass, which proves to demonstration that the waters of the Avon contain all the principles essential to rapid vegetation. Great attention is required, and some experience, to irrigate meadows, so as to give the greatest profit.

In hot weather, when we should imagine that the land must be thirsty, and that too much water cannot be poured over it, much mischief may be done by injudicious flooding. In winter, on the contrary, the land may be covered with water for weeks without injury; and if an earthy deposit takes place, the subsequent fertility is greatly increased. But this is not properly irrigation: it is inundation, and the effects depend on entirely different causes. When low meadows are inundated in winter and spring, it is the muddiness of the water which enriches the land: a fine layer of extremely divided matter is deposited, and when the water subsides this acts as a coat of manure.

Water may be carried in small channels through meadows without being allowed to overflow, and in this case the effect is similar to that caused by rivers or brooks which wind slowly through valleys, and produce a rich verdure along their course. This is watering, but not properly irrigating. When this is done judiciously, the effect is very nearly the same as when the land is irrigated; and in hot climates it may be preferable, by giving a constant supply of moisture to the roots, while the plants are growing. The great advantage of water-meadows in England is not so much the superior quantity of grass or hay which is obtained when they are mown, as the early feed in spring, when all kinds of nutritive fodder are scarce; when the turnips are consumed before the natural grass or the rye sown for that purpose is fit to be fed off, the water-meadows afford abundant pasture to ewes and lambs, which by this means are brought to an early market. The farmer who has water-meadows can put his ewes earlier to the ram, without fear of wanting food for them and their lambs in March, which is the most trying season of the year for those who have sheep. At that time an acre of good grass may be worth as much for a month as a later crop would for the remainder of the year. When it is intended to form a water-meadow on a surface which is nearly level, or where a fall of only two or three feet can be obtained in a considerable length, the whole of the land must be laid in beds about 20 or 30 feet wide, the middle or crown of these beds being on a level with the main feeders, and the bottoms or drains on a level with the lower exit of the water, or a little above it. To form these beds most expeditiously, if the ground is already in grass, the sod may be paired off and relaid after the beds are formed, by which means the grass will be sooner re-established; but except in very heavy soils, where the grass is some time in taking root, the easiest and cheapest way is to plough the land two or three times towards the centre, and dig out the drain with the spade: the earth out of the drains, and that which is taken out of the upper trench or feeder, may be spread over the bed to give it the proper slope. A roller passed over the bed in the direction of its length will lay it even, and the seeds of grasses being sown over it, the water may be let on for a very short time to make them spring. As soon as the grass is two or three inches above ground a regular flooding may be given, and in a very short time the sward will be complete. Instead of sowing seed, tufts of grass cut from old sward may be spread over the newly formed beds, and they will soon cover the ground. The Italian rye-grass, which has been lately introduced into this country from Lombardy and Switzerland, grows so rapidly, that if it be sown in February, or as soon as the snow and frost are gone, it will afford a good crop to feed off in April, or to mow for hay by the beginning of May; and after that it may be cut repeatedly during the summer. But where the soil is good and the water abundant, good natural grasses will spring up without much sowing, and soon equal the old water-meadows.

It seems essential to the formation of a good water-meadow that the bottom be porous and free from stagnant water; hence under-draining is often indispensable before a water-meadow can be established; and a peat-bog, if drained and consolidated, may have water carried over its surface, and produce very good herbage. If the soil is a very stiff clay, draining is almost indispensable where a water-meadow is to be made. The more porous the soil the less depth of water is required, which is not obvious at first sight; but the clay lets the water run over the surface without soaking into the roots, whereas the porous soil is soon soaked to a considerable depth. The water must therefore be longer on the clay than on the sand or gravel to produce the same effect. If the water is properly applied all kinds of soils may be converted into fertile water-meadows. On very stiff clays a coat of sand or gravel, where it can be easily put on, will greatly improve the herbage. It should not be ploughed in, but laid on the surface two or three inches thick: chalk will also improve the herbage.

The usual time of letting on the water on water-meadows is just before Christmas, and it may continue to flow over the land as long as the frost lasts: in mild weather it may be turned off during the day and put on again at night until the frost is gone. The grass will soon begin to grow, and be ready to be fed off. When this is done the water is immediately let on for a short time, and turned off again to allow the ground to dry after a few days' flooding, and the water is let on again at short intervals. The warmer the air is, the shorter time must the water be allowed to cover the meadows. As soon as the grass is five or six inches long it must be left dry entirely till it is mown or fed off. In summer the floodings must be very short; seldom more than twenty-four hours at a time, but frequent. Thus a great weight of grass may be obtained year after year without any manure being put on the land, care being taken that where the surface is not quite even the hollows be filled up with earth brought from another place, or dug out of the drain, if that should be partially filled up with the soil which the water has carried into it. We alluded before to a case where water may remain a considerable time on the land without injury; this is, when there are inundations from rivers, which rise above their beds in spring and cover the low meadows which lie along their

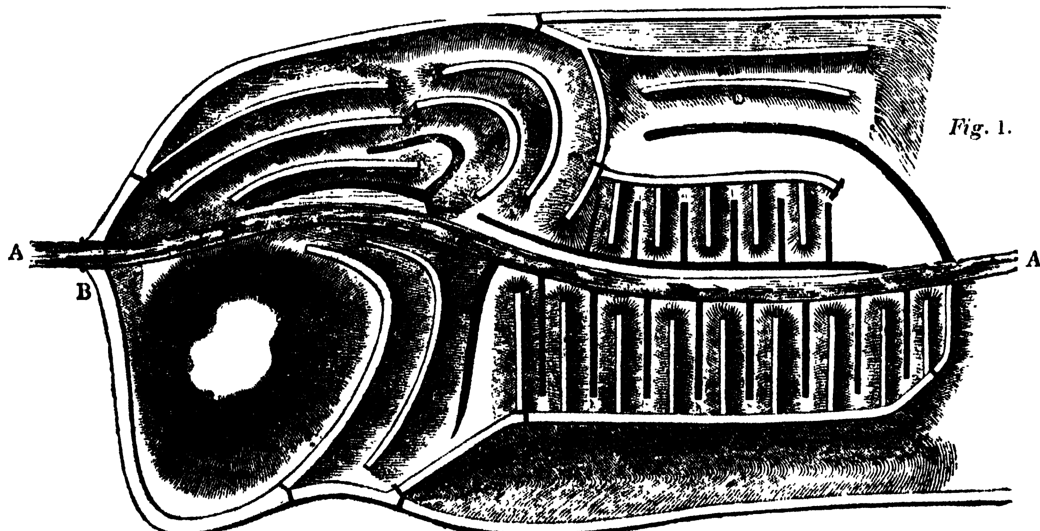


Fig. 1.

banks. In this case the grass, which has not yet sprung up, is protected from the cold, and if there is a deposit from the water there is a considerable advantage. But when it subsides, it must be made to run off entirely, without leaving small pools, by which the grass would invariably be injured. Small ditches or channels are usually dug, by which all the water may run off, unless where the subsoil is very porous, or the land is well under-drained, which is seldom the case in these low meadows, for the drains would be apt to be choaked by the earthy deposit from the water. These inundations can sometimes be regulated by means of dykes and flood-gates, in which case they partake of the advantages of irrigation, and also of that deposition of fertilizing mud which is called warping. [WARPING.]

The preceding plan (*fig.* 1) will explain what has been briefly said respecting the different modes of irrigating land. A A is a river which has a considerable fall, and then flows through a level plain. A considerable channel is cut at B, where there is a rapid fall over a natural or artificial dam. This channel is carried round a hill and supplies a series of channels, C, C, C, placed below each other, forming catch-work along a declivity. A portion of the water goes on to D, where it supplies the feeders of a regular set of ridges, or beds, made as before described, from which the water returns into the river by a main trench, into which all the drains run.

On the other side of the river, where the slopes lie somewhat differently, there are several examples of catch-work, the black lines representing the drains which receive the water after it has flowed over the surface and carry it into the river below. It is evident that all the feeders are nearly horizontal, to allow the water to flow over their sides.

Fig. 2.

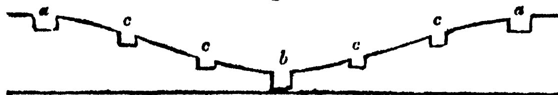
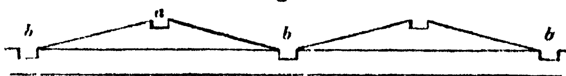


Fig 2 is the section of catch-work. *a, a,* are the feeders; *b,* the drain; *c, c, c, c,* intermediate channels which act as feeders and drains.

Fig. 3.



Ridge-work.

Fig 3 is the section of two adjoining ridges. *a, a,* the feeders; *b, b, b,* the drains.

Fig. 4.

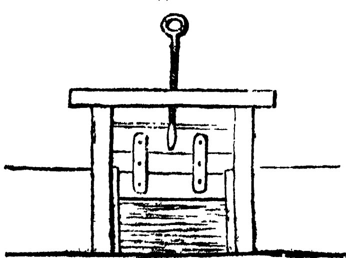


Fig. 4 is a sluice to regulate the flow of water

IRRITABILITY. [HALLER.]

IRTISCH. [SIBERIA.]

IRVINE, a royal borough and seaport town in the district of Cunningham and county of Ayr, 68 miles southwest by west from Edinburgh. It is situated on a rising ground to the north of the river Irvine, and about half a mile distant from the harbour, which lies to the south-west of it. The town is dry and well aired, and consists of one broad street, which communicates with the southern suburb by means of a narrow stone bridge of four arches, rebuilt in the year 1826. The principal public buildings are the church and town-house. The harbour is commodious, having from nine to eleven feet water on the bar at spring-tides; though during violent gales from the south it rises to sixteen feet. The rapid growth of Kilmarnock has tended greatly to increase the trade of Irvine, which is the nearest seaport to that town. The dues levied at the port during the five years preceding 1832 averaged 450*l.* per annum. Ship-building is carried on upon a small scale. Irvine, in union with Rothsay, Inverary, Campbelltown, and Ayr, returns one member to parliament. The school, wherein Greek, Latin, French, and the mathematics are taught, is ably conducted by the rector and an English assistant. The population of the burgh and parish of Irvine in 1831 was 5200. (Carlisle's *Dictionary*; *Beauties of Scotland*; *Population Returns*, &c.)

ISABELLA of CASTILE. [COLUMBUS; FERDINAND V.]

ISÆUS, one of the ten Athenian orators, was a native of Chalcis, or, according to other accounts, of Athens. Dionysius could not ascertain the time of his birth or death. So much as this appears certain: the vigour of his talent belonged to the period after the Peloponnesian war, and he lived to see the time of king Philip. Hermippus, who wrote the lives of the pupils of Isocrates, has recorded nothing more of Isæus than that he was a pupil of Isocrates, instructed Demosthenes, and enjoyed the society of the chief philosophers of his time.

The author of the Life of Isæus, attributed to Plutarch, mentions sixty-four orations of Isæus, fifty of which were allowed to be genuine. At present there are only eleven extant, all of which are of the forensic class (λόγοι δικανικοί), and all treat of matters relating to wills and the succession to the property of testators, or persons intestate, or to disputes originating in such matters. These orations are valuable for the insight which they give us into the laws of Athens as to the disposition of property by will, and in cases of intestacy, and also as to many of the forms of procedure. Dionysius, in his laboured comparison between Lysias and Isæus, sums up as follows:—'In reading Lysias one would not suppose that any thing is said either in an artificial manner or without perfect sincerity, but everything appears natural and true; thus forgetting that it is the height of art to imitate nature. In reading Isæus one has just the contrary feeling; nothing appears to be spoken naturally and without an effort, not even what really is so spoken; but everything seems of set purpose, framed to deceive, or for some other sinister end. One would believe Lysias, though he were stating what was false; one cannot, without some feeling of distrust, assent to Isæus, even when he speaks the truth.' Again:—'Lysias seems to aim at truth, but Isæus to follow art: the one strives to please, the other to produce effect.'

Dionysius adds that, in his opinion, with Isæus originated that vigour and energy of style (δεινότης) which his pupil Demosthenes carried to perfection. So far as the extant specimens of Isæus enable us to form an opinion, this judgment appears to be just. The perspicuity and the artless simplicity of the style of Lysias are admirable; but on reading Isæus we feel that we have to do with a subtle disputant and a close reasoner, whose arguments are strong and pointed, but have too much the appearance of studied effect, and for that reason often fail to convince.

The best edition of the text of Isæus is by Bekker. The oration on the 'Inheritance of Menecles' was first published by Tyrwhitt, London, 1785; and that on the 'Inheritance of Cleonymus' first appeared in its complete form at Milan, 1815, by Ang. Mai. The translation of Isæus by Sir William Jones (1779, 4to.) will give an English reader a sufficient notion of this orator; but the translation is somewhat deficient in critical accuracy, and also wanting in force.

ISAIAH (יְשַׁעְיָהוּ, LXX. 'Ησαΐας), one of the most celebrated of the Hebrew prophets, lived during the reigns of Uzziah, Jotham, Ahaz, and Hezekiah (*Is.* i. 1; vii. 1; xiv. 28; xxii.; xxxvi.—xxxviii.), and was contemporary with the prophets Amos, Hosea, Joel, and Micah. We possess no particulars in the Old Testament respecting the place of his birth or his history; but we learn from the inscription of the book that he was the son of Amoz, who was, according to one Jewish tradition, the brother of Amaziah, king of Judah; but according to another was considered to be the same person as the prophet Amos. The latter tradition is evidently wrong; since the name of the prophet is עָמוֹס, while the name of the father of Isaiah is אָמוֹץ. It is probable, from the 6th chapter of the book, that Isaiah entered upon his prophetical office in the last year of the reign of king Uzziah, B.C. 759. He continued to prophesy at least till the fourteenth year of the reign of Hezekiah, B.C. 713 (2 *Kings*, xix. 2-7; *Is.* xxxvi.—xxxviii.), a period of forty-six years. According to an antient Jewish tradition, which is also given in the apocryphal book of the 'Ascension of

Isaiah,' he was put to death during the reign of the cruel Manasseh (2 *Kings*, xxi. 16); who is said by Josephus (*Antiq.*, x. 3, § 1) to have slain all the prophets in Jerusalem. Manasseh commenced his reign B.C. 697; and Isaiah must therefore have continued to prophesy for sixty-two years at least, if this tradition is correct. Isaiah had a greater influence in public affairs than any other prophet, except Elijah and Elisha. He appears to have been the intimate friend of Hezekiah; and it was principally owing to his advice and firmness that the army of Sennacherib was defeated.

The prophecies of Isaiah consist of sixty-six chapters, all of which were considered, till within the last thirty or forty years, to have been composed by the prophet himself. But it is the common opinion of the critics in Germany usually called Rationalists, that the book of Isaiah is a collection of prophecies delivered by different persons, which were collected and arranged in their present form during the Babylonian exile. The whole of the latter part of the book, from ch. xl. to ch. lxvi., is supposed to have been written at Babylon during the exile, and a considerable part of the first thirty-nine chapters is attributed to other authors than Isaiah. Some critics have called the book a 'poetical anthology.' This opinion was first maintained by Koppe, and has been supported by Döderlein, Justi, Eichhorn, Bauer, Paulus, Rosenmüller, Bertholdt, De Wette, Augusti, and at great length by Gesenius in his translation of Isaiah, Leip., 1821-9. The best arguments in defence of the common opinion are given by Jahn in his 'Introduction to the Bible,' by Professor Lee in his 'Sermons and Dissertations on the Study of the Scriptures,' and by Hengstenberg in his 'Christologie des alten Testaments,' Berl., 1829-35.

If we admit Isaiah to have been the author of the book which bears his name, it is nearly certain that the prophecies are not arranged at present in the order in which they were delivered. The sixth chapter apparently contains an account of the inauguration of the prophet in his sacred office, and appears to have been the first prophecy that was published by him. The twenty-second chapter consists of two separate parts which have no connexion with each other, and were probably published at different times; the former half of the chapter (1-14) containing a prediction of the invasion of the Medes and Persians, while the latter half gives an account of the disgrace of a courtier of the name of Shebna during the reign of Hezekiah. It is therefore difficult to give any connected account of the contents of the book; but the following arrangement, taken from Gesenius, is perhaps the best upon the whole.

The first part (i.—xii.) principally consists of prophecies relating immediately to the Jewish people; the second part (xiii.—xxiii.) contains predictions against the Babylonians, Assyrians, Philistines, Moabites, Syrians, Egyptians, and other foreign orations; the third part (xxiv.—xxxv.), with an historical appendix (xxxvi.—xxxviii.) containing an account of the invasion of Sennacherib, contains prophecies of the invasion of Judæa by the Babylonians, of the destruction of Jerusalem, the captivity of the people, and their final restoration to their native country; the fourth part (xl.—lxvi.) principally refers to the restoration of the church; it contains many prophecies respecting the deliverance of the Jews from captivity, the destruction of idols, the spread of the true religion over the earth, the conversion of the Gentiles, and the coming of the Messiah.

The prophecies of Isaiah have always been held in great veneration by the Jews. Jesus, the son of Sirach, speaks of Isaiah as 'a prophet great and faithful in his vision, who saw by an excellent spirit what should come to pass at the last, and comforted them that mourned in Sion. He showed what should come to pass for ever, and secret things before they came.' (*Ecclesiasticus*, xlviii. 22-25.) Josephus and Philo frequently speak of Isaiah in terms of the greatest respect; and his prophecies are constantly quoted by the writers of the New Testament. See *Matt.* i. 22, 23, compared with *Is.* vii. 14; *Matt.* iii. 3, with *Is.* xl. 3; *Matt.* iv. 14-16, with *Is.* ix. 1, 2; xlii. 7; *Matt.* viii. 17, with *Is.* liii. 4; *Matt.* xiii. 14, 15, with *Is.* vi. 9, 10; *Matt.* xxi. 13, with *Is.* lvi. 7; *Luke*, iv. 17-19, with *Is.* lxi. 1-3; *Acts*, xiii. 34, with *Is.* lv. 3; *Acts*, xxviii. 25-27, with *Is.* vi. 9, 10; *Rom.* ix. 27, 28, with *Is.* x. 22; *Rom.* ix. 29, with *Is.* i. 9; *Rom.* ix. 33, with *Is.* viii. 14; *Rom.* x. 16, with *Is.* liii. 1; *Rom.* x. 20, 21, with *Is.* lxv. 1, 2; 1 *Cor.* i. 19, 20, with *Is.* xliv. 25; 2 *Peter*, iii. 13, with *Is.* lxv. 17.

A considerable part of the prophecies of Isaiah are supposed by most Christian divines to relate to the Messiah. The following list is taken from Gray's 'Key to the Old Testament,' pp. 369, 370: the divine character of Christ (vii. 14; ix. 6; xxxv. 4; xl. 5, 9, 10; xlii. 6-8; lxi. 1; lxii. 11; lxiii. 1-4); his miracles (xxxv. 5, 6); his peculiar qualities and virtues (ix. 2, 3; xl. 11; xlii. 1-3); his rejection (vi. 9-12; viii. 14, 15; liii. 3); his sufferings for the sins of man (liii. 4-11); his death, burial (liii. 8, 9), and victory over death (xxxv. 8; liii. 10-12); his final glory (xlix. 7, 22, 23; lii. 13-15; liii. 4, 5), and the establishment, increase (ii. 2-4; ix. 7; xlii. 4; xlvi. 13), and perfection (ix. 2-7; xi. 4-10; xvi. 5; xxix. 18-24; xxxii. 1; xl. 4, 5; xlix. 9-13; li. 3-6; lii. 6-10; lv. 1-3; lix. 16-21; lx.; lxi. 1-5; lxv. 25) of his kingdom. The number of Isaiah's prophecies relating to the Messiah was thought by Jerome to be so numerous and important, that he says, in his preface to the book, that Isaiah ought rather to be called an Evangelist than a prophet; and many modern commentators give him the title of the Evangelical Prophet.

The style of Isaiah is said by Lowth (*Prælect.* xxi) 'to abound in such transcendent excellencies, that he may be properly said to afford the most perfect model of the prophetic poetry. He is at once elegant and sublime, forcible and ornamented; he unites energy with copiousness, and dignity with variety. In his sentiments there is uncommon elevation and majesty; in his imagery the utmost propriety, elegance, dignity, and diversity; in his language, uncommon beauty and energy; and notwithstanding the obscurity of his subjects, a surprising degree of clearness and simplicity. To these we may add that there is such sweetness in the poetical composition of his sentences, whether it proceed from art or genius, that if the Hebrew poetry at present is possessed of any remains of its native grace and harmony, we shall chiefly find them in the writings of Isaiah.'

In addition to the book of prophecies, Isaiah is also said to have written the lives of Uzziah (2 *Chron.* xxvi. 22) and Hezekiah (2 *Chron.* xxxii. 32). The former work is entirely lost: but we probably possess the greater part, if not the whole, of the latter in chapters xxxvi.—xxxviii. of his prophecies.

We learn from the Fathers that several apocryphal works [APOCALYPSE], which were in circulation in the early ages of the Christian æra, were attributed to Isaiah. An Ethiopic translation of one of these works, entitled the 'Ascension of Isaiah,' which was originally written in Greek and is quoted by Epiphanius (*Hæres.* xl. 2) and Jerome (*Commentary upon Is.* lxiv. 4), was published for the first time by Dr. Laurence, Oxf. 1819, 8vo. This work contains an account of the prophet's ascension through the firmament and the six heavens into the seventh, and also of his martyrdom during the reign of Manasseh.

(The Introductions of Eichhorn, Jahn, De Wette, Augusti, and Horne; Vitringa, *Commentarius in Librum Proph. Isaiæ*, 2 vols. fol. 1714-1720; Lowth's *Isaiah*, Lond. 1778, frequently reprinted; there is a good German translation of this work with many additions by Koppe, 4 vols. 1779-1781; Döderlein's *Esaias*, 8vo., 3rd ed., 1789, with excellent notes; Rosenmüller's *Scholia*; Gesenius, *Der Prophet Jesaia, übersetzt und mit einem vollständigen philologisch-critischen und historischen Commentar begleitet*, Leip. 1821-9, the best translation and commentary that has yet appeared.)

IS'CHIA, the antient Ænaria, an island situated at the northern entrance of the Bay of Naples, the smaller island of Procida lying between it and the promontory of Misenum on the mainland. Procida (Prochyta), according to an old tradition, was rent from Ischia by an earthquake. The island is mountainous; the highest summit, called Mount Epomeo, which is an extinct volcano, rises about 2500 feet above the sea, and has near its summit distinct traces of two very large craters. The volcanic district of Naples is considered to comprise not only Vesuvius, with Pozzuoli and Cumæ, but also the islands of Procida and Ischia. The last eruption of the Epomeo was in 1301, when a broad stream of lava ran over the eastern part of the island, for nearly two miles, as far as the sea. Strabo calls this island by the name of Pithecusæ, which is not, as Pliny observes, derived from pithécus (an ape), but from a word of similar form, which signifies an earthen vessel. The clay of the island, it seems, has been used for earthenware from the remotest time. The island was settled by Greeks of Chalcis and Eretria. There were numerous traditions of volcanic

action having taken place in this island; and Timæus mentions a violent eruption of Epomeo a little before his time. The soil of Ischia is very fertile, and produces corn, abundance of wines, and all sorts of fruit. The hills are covered with chesnut trees. The island is about twenty miles in circuit, and contains 24,000 inhabitants, who have a reputation for good behaviour much above that of their neighbours of the mainland. Robbery and murder are very rare in the island, and the houses are frequently left by the owners with the door merely on the latch without any suspicion or fear. The people are industrious, very frugal, and good tempered. Ischia forms part of the province of Naples; it contains four small towns or villages: 1. Ischia, which is a bishop's see and has a castle; 2. Foria, which is the most commercial place on the island; 3. Casamicciola, the neighbourhood of which contains excellent clay, of which a great quantity of pottery is made and sent to Naples; 4. Lacco: besides several hamlets. The island abounds with mineral springs, which are much frequented by invalids from Naples, and are found efficacious for curing several distempers. Ischia is altogether one of the finest islands near the coast of Italy. (De Quintis, *Inarime, seu de Balneis Pithecusarum, libri vi.*, 8vo., Naples, 1726; G. Poulett Scrope, *On the Volcanic District of Naples*, in *Geolog. Trans.*, second series, vol. ii.; Strabo, *Casaub.*, p. 248; Plin., *Nat. Hist.*, ii. 88, iii. 6.)

ISEGHEM, a market-town in the province of West Flanders. The population of the town is 2100, and that of the parish about 7000 inhabitants. The inhabitants manufacture considerable quantities of linen and tape. It is nine miles north by west of Courtray, and twenty miles south of Bruges.

ISER. [BAVARIA.]

ISE'RE, a river in the south-eastern part of France, belonging to the system of the Rhône. It has its source near Mont Iseran (13,262 feet high), in the chain of the Pennine Alps in Savoy. It flows 20 miles north-west to St. Maurice, and then 15 miles south-west to Moutiers or Moutier; from Moutiers it turns again to the north-west and flows 12 miles to Conflans, the most northern point of its course; and again turning south-west, flows 22 miles to Montmeillan, where its navigation commences. In the upper part of its course it receives some small tributaries, the combined streams of the Darou and the St. Jean at Moutiers; the combined streams of the Arli and Doron at Conflans; and between Conflans and Montmeillan, the Arc, an alpine stream 68 miles long, which passes St. Jean de Maurienne. Just below Montmeillan the Isère turns to the south, crosses the French frontier, gradually bends to the south-west and west, passes Grenoble, dividing that town into two parts, and unites with the Drac, its most important tributary. From the junction of the Drac the Isère flows north-west for a short distance, and then turning to the south-west, flows past St. Marcellin and Romans into the Rhône, which it joins between Tournon and Valence. The length of the navigable part of the Isère below Montmeillan is about 90 miles: its whole course is about 160 miles.

The Drac rises in the department of Hautes Alpes, and has a course of 72 or 73 miles. It receives the Sevrayes, the Bonne, the Romanche, and other streams.

The Isère is of moderate breadth, but of great depth. Its waters are of a blackish colour, which is attributed by some to the débris of the slate rocks of the Tarentaise, a district in Savoy, through which it flows. The stream is liable to inundations, which cause the most disastrous effects. It is used for floating timber from Moutiers, 34 miles above Montmeillan. Between the last-mentioned town and Grenoble the navigation is very difficult, on account of the great number of islets in the bed of the river. Iron, hemp, linen and woollen cloth, and wood are carried down the stream. Barges laden with salt and other merchandise ascend it from the Rhône to Grenoble and Montmeillan.

ISE'RE, a department of France, taking its name from the river above mentioned. It is bounded on the north by the department of Ain, from which it is separated by the Rhône; on the west by the departments of Rhône, Haute Loire, and Ardèche, from which also it is separated by the Rhône; on the south-west and south by the department of Drôme; and on the south-east by that of Hautes Alpes: on the east and north-east it is bounded by the duchy of Savoy, part of the dominions of the king of Sardinia. Its form, though irregular, approximates to that of a parallelogram; having its sides facing the north-east, south-east, south-west, and north-west respectively. Its greatest length is from the north-west, on the banks of the Rhône, near Lyon, to the south-east, not far from Briançon, in the department of Hautes Alpes, 92 miles; its greatest breadth at right angles to the length is from near the little town of Allevard, amid the Alps, to the bank of the Isère, below St. Marcellin, 55 miles. Its area is 3205 square miles, which is considerably above the average area of the French departments, and above the area of any English county except Yorkshire; it is about equal to the conjoint areas of Shropshire, Staffordshire, and Worcestershire. The population by the census of 1831 was 550,258; by that of 1836, 573,645; showing an increase in five years of above 23,000 in a population of more than half a million. The census of 1836 gives 179 inhabitants to a square mile, which is above the average density of population in France, but very far below that of the above-mentioned English counties. Grenoble, the capital, is on the banks of the Isère, in 45° 11′ N. lat., and 5° 43′ E. long.

Nearly the whole of this department is covered with mountains. A branch of the Alps, which joins the principal chain between Mont Genèvre and Mont Cenis, and extends to the Rhône, forms the boundary between this department and the Sardinian dominions. In this branch or in its subordinate ramifications are the summits, Mont Trois Ellions, 12,737 feet high; Col de Saix, 10,971 feet; Pic de Belladone, 10,229 feet; La Roche Grenico, 9973 feet; Sept Laux (upper summit), 9743 feet; and the Col du Galibier, 9154 feet. Some of the summits of this mountainous tract are covered with perpetual snow, and enclose glaciers. The mountains are traversed by narrow passes, and the slopes and precipices are covered with dark forests. Mountain streams tumble from rock to rock, or pass rapidly through deep glens. Grottos with stalactites are common in the mountains: that of La Balme was counted among the wonders of Dauphiné. [BALME, LA.] Some of the valleys are of tolerable width and of great beauty, as that of Grésivaudan, watered by the Isère; but there are no plains except in the northern and western parts towards the banks of the Rhône. The whole department is comprehended in the basin of the Rhône.

The chief rivers are the Rhône, which borders the department on the north and west. The Guiers, formed by the junction of two streams, the Guiers Vif and the Guiers Mort, skirts the north-eastern boundary, and joins the Rhône on its left bank at the point where the latter first touches the department. A number of small streams, which successively fall into the Rhône on its left bank, water the more level districts of the north-west. The Isère crosses the department in the direction of its breadth, watering the valley of Grésivaudan: its junction with the Rhône is in the adjacent department of Drôme. The Drac has the greater part of its course in this department.

In the alpine country are many lakes; the principal is that of Paladru, near the head of the Fure, which runs through the lake. There are also several marshes.

The mountains east of the junction of the Isère and the Drac consist of granitic and other primitive rocks. To the north and west of this district, extending to the banks of the Bourbre and the junction of that river with the Rhône, and to the lower part of the valley of the Isère, are found the rocks intervening between the chalk and the new red or saliferous sandstone. Still more to the west, extending to the banks of the Rhône below the junction of the Bourbre, are found the supercretaceous strata.

The high road from Paris by Lyon, Chambéry, and Mont Cenis to Turin, passes through this department, also the road from Paris by Lyon to Aix, Marseilles, Toulon, Nice, and Genoa. The former enters the department just after it leaves Lyon, and passes by Bourgoin and La Tour du Pin to Pont de Beauvoisin, where it crosses the Guiers into Savoy. The road to Aix also enters the department just after leaving Lyon, and runs south by Vienne, along the valley of the Rhône, into the department of Drôme. The road from Paris to Grénoble branches from that to Chambéry and Turin at Bourgoins, and passes by Moirans and Voreppe, and along the valley of Grésivaudan to Grenoble: from this city two roads lead, one by the valley of the Isère into the Turin road at Montmeillan, the other by the valley of the Romanche to Briançon (Hautes Alpes) and by Mont Genèvre to Turin, with a branch by the valley of the Drac to Gap in the department of Hautes Alpes. The aggregate length of the *Routes Royales* is 336 miles, about two-thirds

of which are in good repair; the rest is out of repair or unfinished. The aggregate length of the *Routes Départementales* is 284 miles, more than seven-eighths of which are in good repair. The bye-roads and paths have an aggregate length of nearly 1400 miles.

The inland navigation is made up of that of the Rhône, 97 miles; and that of the Isère, 60 miles; together 157 miles.

The climate differs much according to the nature of the surface. In the plains the summer is very hot and the winds violent; in the marshy flats the temperature is lower and the air moister; in the deep valleys there are sometimes rapid changes of temperature, and at other times long periods both of rain and drought. The high mountains have but two seasons, a long winter of nine months, with a brief summer. The air of the department is generally keen, pure, and healthy; but the changes render the crops very uncertain. From the different elevation of the surface the natural productions are of very various character. The valley of Bourg d'Oysans, the most elevated of the larger valleys, produces rye, barley, potatoes, and a considerable quantity of hay: the valley of St. Laurent du Pont, or of the Chartreuse [CHARTREUSE], is in general covered with pine forests; some spots produce grain and hemp: the valleys of Voiron and Vizille are chiefly productive of hemp: the valley of Grésivaudan, one of the most fertile districts in France, produces grain of all sorts, wine, fruit, &c. The more level districts of the department have generally a dry, sandy, or stony soil; some parts however are marshy. The advancement of agriculture has increased the productiveness of these districts; some of the marshes have been drained, and the drier soils are improved by irrigation. The crops consist of wheat, rye, pulse, hemp, wine, fruit, and hay: and notwithstanding the injury done by a changeable climate, violent winds, and storms of hail, the produce of the department exceeds its consumption The wines, especially those of the neighbourhood of Vienne, are in good repute. The forests yield beech, elm, and especially pine timber. Many horses are bred; the mules are excellent; the asses small. The cattle are small, but the cows give much milk; and the cheese called Sassenage cheese, from a village or small town of that name near Grenoble, where it is chiefly sold, is excellent. Sheep are numerous, and have a fine soft fleece: immense flocks are driven every spring from the neighbouring departments to the upland pastures of the Alpine valleys. Goats, pigs, and poultry are numerous; and a considerable number of silkworms are reared in those parts which admit of the growth of the mulberry. Of wild animals there is considerable variety: the bear, the lynx, the chamois, the wild goat, and the marten, are found in the mountains: game is tolerably plentiful, and fish abundant.

The mineral wealth of the department is considerable. Gold, silver, lead, copper, iron in abundance, zinc, mercury, antimony, bismuth, cobalt, coal, rock-crystal, granite, marble, alum, sulphur, gypsum, marl, potter's clay, and sandstone are found; but of these, only lead, iron, and coal, with some marble quarries and clay pits, are wrought. The gold and silver mines have been abandoned, not being sufficiently productive to pay more than the cost of working them. There are several mineral springs.

The department is divided into four arrondissements as below: it contains forty-five cantons, or districts under a justice of the peace, and 555 communes:—

Name of Arrondissement and Situation.	Area in sq. miles.	Pop. 1836.	Communes.
Grenoble, S. & E.	1599	213,568	214
La Tour du Pin, N.	512	129,809	125
St. Marcellin, S.W.	413	85,267	84
Vienne, W.	681	145,001	132
	3205	573,645	555

In the arrondissement of Grenoble are the capital (population in 1836, 28,969) [GRENOBLE], Voreppe (population 1505), Sassenage, Goncelin, Theys, Allevard, and Fort Barraux, all on or near the Isère; Corps, Mens, La Mure (pop. 2785), Monetier de Clermont, Vif, Varces, and Claix, in or near the valley of the Drac; Le Bourg d'Oysans (pop. 3052) [BOURG], and Vizille (pop. 2422 town, or 2750 commune), in that of the Romanche; Le Villard de Lans on the Bourne; Les Echelles (pop. about 1500) and St. Laurent du Pont (pop. 3156) on the Guiers; the establishment, formerly monastic, of the Grand Chartreuse [CHARTREUSE, GRAND], in the desert near St. Laurent; Chirens, and Voiron (pop. 6924). At Vizelle are manufactures of printed cottons, yarn, and paper. Sassenage is the great mart for the cheese of the surrounding districts. It is also remarked for a natural curiosity,—two cylindrical excavations in two grottoes, in which the supply of water was once supposed to presage the abundance or failure of the harvest. Voiron is the mart for the linens manufactured in the department.

In the arrondissement of La Tour du Pin are the capital (pop. in 1836, 2484), Bourgoin (pop. 3447 town, 3762 commune), Virieu and Le Grand Temps near the Bourbe; St. Clef or St. Chef (pop. 3397) between that river and the Bourbre; St. Geoire (pop. 4635) and Le Pont de Beauvoisin (pop. 1943 town, 2139 commune) in or near the valley of the Guiers; Moretel, Quirieu, and Crémieu or Crémieux (pop. 2058 town, 2401 commune), in or near the valley of the Rhône. There are mineral springs at Le Pont de Beauvoisin.

In the arrondissement of St. Marcellin are St. Marcellin (pop. in 1836, 2885), St. André, Beauvoir, Vinay, Lalbene, Tulliens or Tullins (pop. 1806 town, 3807 commune), Moirans and St. Quentin, on or near the Isère; St. Antoine on the Furand; Roybon on the Galaure; Viriville and St. Etienne de Geoirs. St. Marcellin is in a pleasant situation amid vine-covered hills; it is well built, and surrounded with walls. The inhabitants trade in raw silk, chesnut and walnut oil, and wine.

In the arrondissement of Vienne, are the capital (pop. in 1836, 16,484) [VIENNE], Roussillon, Le Péage, and St. Symphorien, on or near the Rhône; Beaurepaire (pop. 1924 town, 2138 commune) on the Suzon; La Côte St. André (pop. 2800 town, 4568 commune), Chatonnay, St. Jean de Bournay (pop. 1820 town, 3392 commune), St. Georges (pop. 1636 town, 2872 commune), Heyrieux, and La Verpilière. The inhabitants of La Côte St. André carry on a considerable trade in liqueurs and in the light and sparkling white wines grown round the town.

The department contains many smelting-houses for iron, and some for lead; and a flatting-mill for copper. Iron guns for shipping, nails, and steel are manufactured: there are several potteries and a glass-house for making bottles. Sail-cloth, canvass for wrappers, coarse and fine linens, cotton yarn, calico and printed cottons, thrown silk, woollen cloth for the troops and for other uses, hats, leather of different qualities, and gloves (especially at Grenoble), paper and vellum (especially at Vienne), liqueurs, mineral acids, and turpentine are made. These various articles, with wine, brandy, wool, silk, hemp, and deals, constitute the exports.

The department constitutes the diocese of Grenoble; and is in the jurisdiction of the Cour Royal and the Académie Universitaire of that city. There is a Protestant consistory, of which Mens is the seat. The department is included in the seventh military division, of which the head-quarters are at Grenoble. It returns seven members to the Chamber of Deputies.

In respect of education the department is below the average of France. The proportion of young men enrolled in the military census of 1828-9 who could read and write was 29 in every 100.

This department formed in antient times part of the territories of the Allobroges, a nation of the Celtic stock; the southern parts were probably comprehended in the territories of two other people of Celtic race, the Segalauni and the Vocontii. In the Roman division of Gaul it was included in the province of Viennensis, a subdivision of the more antient and extensive province of Narbonensis. It contained the Roman cities of Vienna (Vienne) and Cularo, afterwards Gratianopolis (Grenoble). From the Romans it passed successively to the Burgundians and the Franks; and in the middle ages was included in Dauphiné. [BURGUNDIANS; DAUPHINÉ; FRANCE.]

ISIDORE, SAINT, of Pelusium in Egypt, lived in the beginning of the fifth century, and wrote, according to Suidas (*Isidorus*), '3000 epistles, explaining the divine Scriptures.' Upwards of 2000 are still extant; they are for the most part very short, and contain many repetitions. They have been published in Greek and Latin by Scholt, Paris, 1638. Dr. Heumann has published a 'Dissertation on Isidore' (Hanover, 1738, 4to.), in which he argues that most of the letters are fictitious, and not a real correspondence

ISIDORE, SAINT, bishop of Seville, in Spain, from A.D 595 or 596 to A.D. 636, one of the most celebrated of the Spanish bishops, was born at Carthagena. He was well acquainted with Greek and Hebrew, and was considered by the Council of Toledo (A.D. 650) as the most learned man of his age. The style of his works is however not very clear, and his judgment appears to have been very defective.

The most important of his works are: 'A Chronicle from the Beginning of the World to A.D. 626;' 'A Book of Ecclesiastical Writers,' in 33 chapters; 'Three Books of Opinions, selected from the writings of the fathers, and especially from St. Gregory;' 'Commentaries upon the historical books of the Old Testament;' 'Allegories on the Old and New Testaments;' 'Two Books of Ecclesiastical Duties,' printed in the 'De divinis Catholicæ Ecclesiæ Officiis ac Ministeriis,' Cologne, 1568; 'A Book of Prolegomena to the Old and New Testaments;' 'Twenty Books of Origines or Etymologies,' which were left unfinished and were published after his death by Braulio, bishop of Saragoza; the first edition of this work was published at Augsburg, 1472.

The works of Isidore have been published by Du Breul, Paris, 1601, and Cologne, 1617; at Madrid, 1778; and by Arevali, Rome, 1797, 1803.

ISIDORE of Charax*, lived probably in the first century of our æra. It appears from Athenæus (*Deip.* iii.) that he wrote an account of the Parthian empire, of which there is only a small part extant, entitled Σταθμοὶ Παρθικοί, or the 'Parthian Halting-places.' This work gives a list of the eighteen provinces into which the Parthian empire was divided, with the principal places in each province, and the distances between each town. This list was probably taken from official records, such as appear, from the list of provinces, &c. in Herodotus, to have been kept in the antient Persian empire.

This work has been printed in the second volume of Hudson's 'Geographiæ veteris Scriptores Græci Minores,' with a Dissertation by Dodwell. There is also a Mémoire on Isidore by Sainte-Croix in the 50th volume of the 'Académie des Belles-lettres;' and some remarks on the 'Parthian Halting-places' in the 'Journal of Education,' vol. ii., p. 305, where the question of the site of Ecbatana is discussed and determined.

ISINGLASS is animal jelly, or gelatin, nearly pure. The best isinglass is prepared in Russia from the membranes of the sturgeon, especially from its air-bladder and sounds, which are remarkably large. These, when removed from the fish, are washed with cold water, and exposed a little to the air, in order that they may stiffen; the outer skin is then taken off and rejected, and the remainder cut out, and loosely twisted into rolls, according to the intended size of the pieces, which are called *staples*, and are known in commerce by the names of long and short staple, and of these the first is the best: these are dried in the air. The best sort of isinglass is used for the table and in confectionary; it is also largely employed in refining wine and beer.

Isinglass is nearly colourless, has but little taste or smell, is translucent in thin pieces, and is soluble in water; one part of it dissolved in 100 parts of hot water give a solution which completely stiffens in cooling.

Isinglass is also dissolved by most acids readily, and also in solution of potash and soda, but not in alcohol. Several metallic salts and oxides have the property of precipitating a solution of isinglass, but corrosive sublimate does not produce this effect, which serves to distinguish it from albumen; but it resembles this substance in being precipitated by infusion of galls or of oak-bark. Isinglass is extremely nutritious.

According to Gay-Lussac and Thenard it consists nearly of—

Seven equivalents of	hydrogen	7
Seven "	carbon	42
Three "	oxygen	24
One equivalent of	azote	14
Equivalent		87

ISIS, one of the chief deities of the Egyptians, the sister of Osiris, was represented as the Goddess of Fecundity, and the cow was therefore sacred to her. She was said to have first taught men the art of cultivating corn. The annual festival of Isis in Egypt lasted eight days, during which a general purification took place. The priests of Isis were bound to observe perpetual chastity, their heads were shaved, and they went barefooted. The goddess was often represented as a woman with the horns of a cow. She also appears with the lotus on her head and the sistrum in her hand; and her head in some instances is seen covered with a hood. Heads of Isis are a frequent ornament of Egyptian capitals on the pillars of the temples. [DENDERAH; EGYPTIAN ARCHITECTURE.]

As the worship of Isis passed into foreign lands, it assumed a foreign character, and many foreign attributes, as we see from the Greek and Roman writers. Sometimes she is represented like Diana of Ephesus, the universal mother, with a number of breasts. The mysterious rites of Isis were probably in their origin symbolical: on one of her statues was the inscription, 'I am all that has been, that shall be; no mortal has hitherto taken off my veil.' But the Isiac rites, transplanted to Italy, became a cloak for licentiousness; and they were repeatedly forbidden at Rome. Tiberius had the images of Isis thrown into the Tiber, but the worship revived, and Juvenal speaks of it in an indignant strain. The Isiac table in the Turin Museum, which is supposed to represent the mysteries of Isis, has been judged by Champollion to be the work of an uninitiated artist, little acquainted with the true worship of the goddess, and probably of the age of Hadrian. (Plutarch's *Treatise on Isis and Osiris*, Wyttenbach's ed., ii. 441; Herod., ii. 41, 42, 123, &c.; Pausan., ii. 13, 7, and particularly x. 32, 13.)

ISLA, or **ISLAY**, the most southern of the Hebrides, belongs to the shire of Argyle, and is 28 miles long and about 18 in breadth. This island, which was once the kingdom of the Norwegian Lords of the Isles, retains but few vestiges of the manners of its early inhabitants. Though generally of a mountainous character, especially towards the north, there is much low and cultivated land. Many of the farmers are comparatively opulent, and practise the lowland system of agriculture. The houses are good, and the roads are kept in good repair. There are several lakes, and the island is well watered by numerous streams and rivulets, which abound with trout and salmon. Isla appears also to be rich in minerals. A copper-mine has been worked here for many years, but the ore is much mixed with lead, which renders the separation expensive and troublesome. The district of Islay comprises six parishes, besides the island of Collonsay, the united population of which in 1831 was 19,780.

(M'Culloch's *Highlands and Western Isles of Scotland*; *Population Returns*, &c.)

ISLAM. [MOHAMMED.]

ISLE of BOURBON. [BOURBON.]

ISMAELITES, or **ISMAELIANS**, were originally a branch of the Shiites, or followers of ALI BEN ALI TALEB. Djafar Madeck, the sixth Imaum in a direct line from Ali having lost his elder son Ismael, appointed his younger son Mousa to be his successor. This caused a schism among the Shiites in the second century of the Hegira. Those who contended that the office of Imaum ought to have descended to the posterity of Ismael, and not to his younger brother, were called Ismaelites, and also Karmathi and Batenis; in Persia they were called Talimis, from the word Talimi, which means 'learning,' because they maintained, contrary to the orthodox Mussulmans, that man can learn the truth only by studying. They established two powerful dynasties, one in Egypt [FATIMIDES], and another in the Irak Ajemi, a part of Persia, the capital of which was Casbin. The Assassins of Persia and Syria were a fanatical sect of Ismaelites. [ASSASSINS.] The Ismaelites of Persia, Syria, and Arabia had frequent wars against the Abbaside caliphs and the other Sunnee Mussulmans, until the dynasty of Casbin was overthrown by the Tartars about the middle of the thirteenth century. After that time the Ismaelites became scattered through Asia, maintaining their tenets and observing their rites in concealment and obscurity. Their tenets appear to have been of a loose kind; they were the freethinkers of Mohammedanism. At the end of the last century they were still existing in Persia, and had their Imaum at Khakh, a village in the district of Khom, enjoying the protection of the Shah, although considered as heretics by the Persian Shiites. They had followers even in India. (J. F. Rousseau, *Mémoire sur les Ismaelis et les Nosaïris*, with notes by De Sacy.) Those of Syria have continued to live in the mountains of

* There were several towns of this name; one in Media, another in Parthia, and a third at the mouth of the Tigris. It is doubtful at which of them Isidore was born.

Semmak, which join Lebanon, and their chief place was Maszyad, near Hamah on the Orontes. The Druses are supposed by some to be a ramification of the old Ismaelites, but they are a distinct people, both in their religious and social character, from the present Ismaelians. [DRUSES.] In 1809 the Nosaïris, another sect living in the same mountainous tract, took Maszyad by surprise, murdered the Emir, with most of the Ismaelian inhabitants, and carried off a large booty. The Ismaelians of Syria have never recovered from that blow, but have remained poor in importance and numbers, and are under the nominal dominion of the Turks. Their tenets are not well known, but they seem to have deviated from the original doctrines of the great Ismaelite sect, and to have mixed them up with gross superstitions. They can hardly be called Mussulmans; they have no mosques, but are circumcised, and they still visit the tomb of Ali at Meshed. They are said to be simple and hospitable, and have a better reputation than their neighbours the Nosaïris.

ISMAIL. [BESSARABIA.]

ISMID, or ISNIKMID. [ANATOLIA; BITHYNIA.]

ISOCA'RDIA, a genus of conchifers. Linnæus placed the form under *Chama;* Bruguière arranged it among the *Carditæ;* Lamarck, who made it the last of the genera of his *Cardiacées*, separated it from the last-mentioned genus, giving it the generic name at the head of this article. Mr. G. B. Sowerby (*Genera of Recent and Fossil Shells*) thinks that this separation was effected with good reason, because the involute divaricate *umbones* of *Isocardia*, and its consequently dichotomous ligament running in each valve to the point of the *umbo*, serve to distinguish it from the other *Carditæ* of Bruguière. M. de Blainville, under the name of *Isocardium*, inserts it between *Tridacna* and *Trigonia* among his *Camacés*. M. Rang retains it in the same family, but restores Lamarck's original termination of the name, and places it between *Caprina* and *Tridacna*.

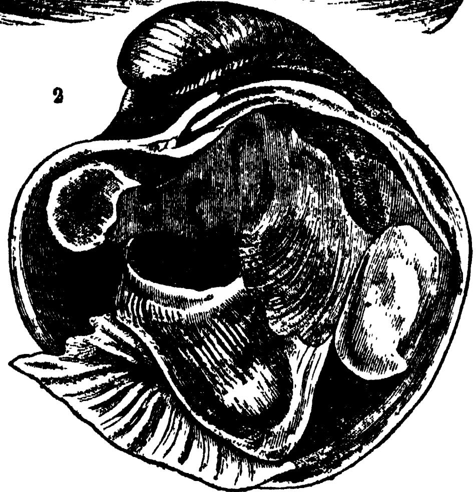
M. Deshayes, in his edition of Lamarck, remarks that the *Isocardiæ* have, in truth, large and contorted *umbones* like *Chama* and *Diceras*, but that they are regular and always free, while the true *Chamæ* are adherent and irregular. From the *Carditæ*, he observes, they are to be distinguished, both as respects the shell and the animal. In *Cardita* the lobes of the mantle are separated throughout their length, and are without siphons. In *Isocardia* the lobes of the mantle are united posteriorly, and provided with two short siphons, or rather perforations, which may be compared with those of the *Cardia*. Here doubtless, says M. Deshayes, the *Isocardiæ* approach the *Cardiæ;* but when the foot and the form of the branchiæ in these two genera are compared, the distinction is obvious. In the *Cardia* [CONCHACEA, vol. vii., p. 426-7], the foot is cylindraceous, very long, and bent in an elbow-like form in the middle; in the *Isocardiæ*, on the contrary, it is flat, subquadrangular, and rather short.

Generic Character.—Animal more or less globular, having the borders of the *mantle* fringed with very fine tentacular papillæ, leaving a rather large opening between them at the lower part, and united posteriorly by a transverse delicate band, pierced with two orifices surrounded by papillæ, one for the vent, and the other, lower, for respiration: *foot* of moderate size and trenchant.

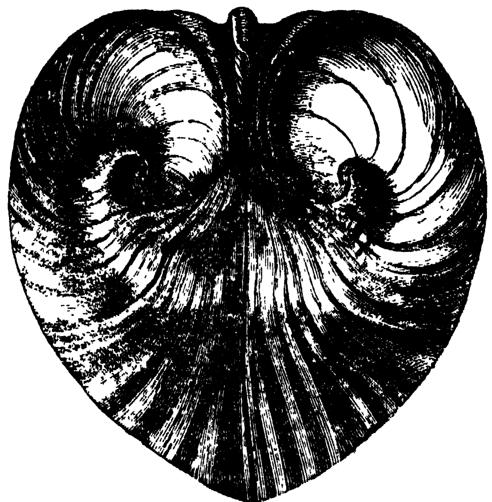
Shell sometimes with an epidermis, very convex, globulose, heart-shaped, equivalve, inequilateral; *umbones* divaricated, and widely divergent, curved forwards and outwards, and slightly spiral; *hinge* composed of two flattened hinge-teeth; *ligament* external, forked at one of its extremities; *muscular* impressions very distant.

The Rev. James Bulwer, from whose figure in the *Zoological Journal*, vol. ii., the two upper figures are taken, saw the animal when in sea-water, and in the position represented at No. 1. The feelers, or ciliated fringe of the upper orifice (the largest) of the mantle, moved slowly, as if in search of food. Having remained in this situation about ten minutes, water was ejected with considerable force from the lower orifice, which had till then remained motionless. The expulsion of the water appeared to be effected by a sudden contraction of the muscles, because this was never done without the valves nearly closing at the same instant. After a few seconds, the valves gradually returned to their open position, and remained quiescent as before, till the water was again ejected with a jerk; this alternating process was repeated during the whole time his specimens (which were trawled up in very deep water on the east coast of Ireland) were under his examination, but at shorter intervals on receiving fresh supplies of sea-water. The animal appeared to Mr. Bulwer to be insensible both to sound and light, as the presence or absence of either did not at all interrupt its movements; but its sense of feeling appeared to be very delicate. Minute substances dropped into the orifice of the mantle instantly excited the animal, and a column of water strongly directed expelled them from the shell; with so much strength was the water in some instances ejected, that it rose above the surface of three inches of superincumbent fluid. (*Zool. Journ.*, vol. ii., p. 359.)





Isocardia Cor. 1, valves open, to show the animal and the feelers or ciliated fringe of the upper and lower orifices; 2, one of the valves, showing the animal with its sharp-edged foot and the muscular impressions.



Shell of Isocardia Cor, valves closed.

Lamarck recorded four species, including *Isocardia semisulcata*, which we shall presently have to notice: M. Deshayes, in his edition of that author, adds four others, reckoning that species; making eight in all, recent and fossil.

Geographical Distribution of the Genus.—The European and East Indian Seas, and those of New Holland.

Isocardiæ have been dredged up from mud and sand at depths ranging from 10 to 20 fathoms.

FOSSIL ISOCARDIÆ.

Mr. G. B. Sowerby remarks (*Genera of Recent and Fossil Shells*) that several fossil species are given in plate 295 of Sowerby's 'Mineral Conchology,' one of which is from the London clay, and the other from Kelloway's. Mr. G. B. Sowerby, in a note, states that a fossil species also occurs in the *crag*, which so nearly resembles the *I. Cor* that he knows not wherein the specific difference consists; and, in

the text, goes on to state that according to Brocchi (*Conch. Foss. Subap.*, ii. 520), two varieties of *I. Cor* are found in a fossil state in several parts of Italy; but as a subject upon which much diversity of opinion exists is here brought into question, he would recommend an attentive and comparative re-examination of the fossil with recent specimens, before the inquirer comes to an absolute decision upon this point. Another fossil species, he observes, is found at Piacenza, viz. *I. arietina*, Lam.; and he has figured *I. Basochiana* (Defr., *Dict. des Sciences Naturelles*), a new species found by M. de Basoches de Falaise, in the district of Coutances. He thus concludes his remarks upon the fossil species of this genus: 'We think we may venture to express our opinion that all the fossil specimens published in various books, and existing in various collections, are not distinctly characterized *Isocardiæ*, but only the casts of the insides of other bivalves: the best distinguishing character is in the groove formed for the extension of the ligament from the hinge to the umbo. It is incumbent on us to mention that in *Isocardia* the line to which the mantle is attached, passing from one muscular impression to the other, is entire.'

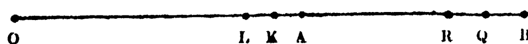
M. Deshayes, in his tables, records two living species and three fossil (tertiary); and *Isocardia Cor* as both living and fossil (tertiary).

Of *Isocardia semisulcata* M. Deshayes (ed. of Lamarck) states that it is to be presumed that the species had been added after the calamity which had befallen the professor: this distressing privation compelled Lamarck to have recourse to the eyes of others; and M. Deshayes is of opinion that this species owes its presence among the *Isocardiæ* to its external form, which has in fact an approximation to the shells of that genus. But, continues the same author, if the hinge and other essential characters had been examined, it would have been perceived that this shell had nothing about it which constitutes the character of an *Isocardia*. He thinks that the form approaches *Mya* and *Anatina*, and that it ought to constitute a particular genus. M. Deshayes then relates that he had some time ago remarked in the collection of M. Michelin a small fossil shell from the environs of Senlis, which afforded such characters as induced M. Deshayes to comprehend it in the group of *Anatinæ* as a genus. He states that this genus had already been established by Shumacher under the name of *Periploma;* but he thinks it right to adopt the name of De Haan, so well known for his treatise on Ammonites and other important works, who had shown to him a recent shell from New Holland presenting exactly the same characters with those of M. Michelin's fossil. M. Deshayes then saw that the two species could not make part of the genus *Periploma*, and that they ought to constitute a new genus. The shell which M. De Haan communicated to him was, he says, the same as that named *Isocardia semisulcata* by Lamarck. M. Deshayes describes it under the name of *Cardilia;* and he records two species—one living, *Cardilia semisulcata*, Deshayes (*Isocardia semisulcata*, Lam.), the other *Cardilia Michelini*, Deshayes, for which he gives as a synonym *Hemicylconosta Michelini*, Deshayes.

Mr. Lea places his genus *Hippagus* (of which he gives an engraving) under the family *Cardiacea*. (*Contributions to Geology*, 8vo., Philadelphia, 1833.) He states that he has in vain endeavoured to place this shell in one of the established genera. In its general character he says that it approaches most closely to the *Isocardia Cor*, but that it cannot be placed in that genus, being destitute of teeth. It bears, he adds, some resemblance to the genus *Inoceramus;* but, he continues, the hinge in that genus 'closes by a series of oblong fossets,' and besides it is very inequivalve. In its natural order he thinks that it seems to follow the genus *Isocardia*, and he proposes to place it in that position. *Hippagus* occurs in the Claiborne beds (tertiary of Alabama—Eocene of Lyell).

ISOCHRONOUS, ISOCHRONISM (ἴσος, equal, χρόνος, time). Vibrations or oscillations which are performed in equal times are called isochronous; and isochronism is the name given to a remarkable property of all systems which are in equilibrium, namely, that when slight disturbance, be the same more or less, is given, the oscillations which take place are all performed in the same time, or so nearly in the same time, that any acceleration or retardation is totally imperceptible. Thus, when a pendulum is allowed to vibrate till it rests, it will be found that there is no perceptible difference between the vibrations of longer and shorter extent; of which any reader may satisfy himself by attaching a weight to a string, and observing the vibrations. But a still better proof may be found in a musical string. the finest ear cannot detect any difference between the pitch of a note made by a smart blow on the key of a pianoforte and that made by a gentle one; yet a very small difference in the number of oscillations per second would be perceptible, and the amount of disturbance from the position of equilibrium is twenty or thirty times greater in the first case than in the second.

When, under two different circumstances, the longer space is described in the same time as the shorter, it must be that the force acting in the first case is greater than that in the second; and it is sufficiently known from experience, that the more a system at rest is disturbed, the greater is the effort which it makes to return. But in order that there may be isochronism, it is not sufficient that the effect to return should increase with the amount of disturbance, but the increase must take place according to one particular law. This law is as follows:—the force of restitution must be always proportional to the disturbance, so that whatever force begins to act when the disturbance is *a*, twice as much acts when the disturbance is twice *a*; and so on for all proportions. That this law does prevail when the disturbance is not great, either absolutely, or so nearly that its error is extremely small, may be proved both by theory and experiment. The most complete proof is to be found in the 'Mécanique Analytique' of Lagrange. Granting the law, we can make it sufficiently apparent that the consequence must follow, namely, that all vibrations are performed in equal times. Let A and B be two material



points which are urged towards the point O by pressures which are proportional to OA and OB; and further let each pressure diminish as either point approaches towards O, so as always to preserve between the pressures at any two points the proportions of the distances of those points from O. Take a minute portion of time, so small that the pressure may not vary sensibly during its continuance: then [ACCELERATION; FALL OF BODIES] the velocities created and the spaces described in that time will be proportional to the pressures producing them. If then, during that time, A move to K and B to Q, AK and BQ (and therefore OK and OQ) will be in the proportion of OA to OB, and the points will be at K and Q, with pressures and velocities proportional to OK and OQ. In a second such instant let the points move to L and R: then KL and QR, partly due to velocities which are as OK to OQ, and partly to accelerations which are in the same proportion, will still be in the proportion of OK to OQ, or of OA to OB. Consequently the whole AL is to the whole BR in that proportion: and reasoning in this way for successive small accelerations, we show that the whole space moved over by A in any time is to that moved over by B in the same time in the proportion of OA to OB. Consequently A describes AO in the same time in which B describes BO; or the half of a vibration of A is made in the same time as half a vibration of B.

To make this process perfectly strict, recourse must be had to the considerations in INTEGRAL CALCULUS.

ISO'CRATES, one of the Greek orators commonly called the Ten, was born at Athens, 436 B.C. He studied rhetoric under Prodicus, Gorgias, Tisias, and Theramenes, and became a master of his art. A certain timidity and feebleness in his delivery prevented him from speaking in public (*Panathenicus*, c. 4), and he was therefore debarred from occupying the high stations which were open to the ambition of his contemporaries. He taught rhetoric both at Chios and at Athens, and his school was attended by numerous disciples, among whom were Xenophon, Ephorus, Theopompus, and other distinguished men of his time. Although no orator himself, he formed many orators; and Isæus, Demosthenes, and others, are said to have studied under him. He is said to have charged one thousand drachmæ for a complete course of oratorical instruction, and to have said to some one who observed on the largeness of the amount, that he would willingly give ten thousand drachmæ to any one who should impart to him the self-confidence and the command of voice requisite in a public orator. The orations of Isocrates were either sent to the persons to whom they were addressed for their private perusal, or they were en-

trusted to others to deliver in public. He is said to have delivered only one himself. Isocrates treated of great moral and political questions: his views are distinguished by a regard for virtue, and an aversion to all meanness and injustice. His politics were conciliatory; he was a friend of peace; he repeatedly exhorted the Greeks to concord among themselves, and to turn their arms against their common enemy Persia. In his 'Panegyrical Oration' (published about B.C. 379), which he wrote in the time of the Lacedæmonian ascendency, he exhorted the Lacedæmonians and Athenians to vie with each other in a noble emulation, and to unite their forces in an expedition against Asia; and he descanted eloquently on the merits and glories of the Athenian Commonwealth, on the services it had rendered to Greece, and on its high intellectual cultivation; while he defended it from the charges, urged by its enemies, of tyranny by sea, and of oppression towards its colonies. He addressed Philip of Macedon in a similar strain after his peace with Athens (B.C. 346), exhorting him to reconcile the states of Greece, and to unite their forces against Persia. He kept up a correspondence with Philip, and two of his epistles to that prince are still extant, as well as one which he wrote to the then youthful Alexander, congratulating him on his proficiency in his studies. But although Isocrates was of a mild and conciliatory disposition, he displayed considerable courage on several occasions, as when he showed his sympathy for Theramenes, who had been condemned by the thirty tyrants; and lastly, he proved that though no violent partisan, he was a warm-hearted patriot, when, at the news of the battle of Chæronea, he refused to take food for several days, and thus closed his long and honourable career at ninety-eight years of age, B.C. 338.

There are extant eight orations of Isocrates of the class called judicial, or forensic (λόγοι δικανικοί), which are valuable for the subject matter. In his oration in favor of the Platæans he took the part of that people, who were expelled from their homes by the Thebans. The oration against Euthynous, which appears to be incomplete, and may possibly never have been spoken, is a most ingenious attempt to determine a dispute as to the restoration of a deposit of money where there was an absence of all direct testimony as to the main fact. The orator puts the probabilities on each side in two opposite scales, and weighs them with consummate skill. Three of the orations of Isocrates—to Demonicus, to Nicocles, and the oration entitled Nicocles, belong to the Parænetic or hortatory class, and the first two partake in some degree of the epistolary style. Isocrates' 'Panathenaicus' is a panegyric of Athens, which he wrote when he was 94 years of age. (*Panath.* c. 1.)

The style of Isocrates is singularly perspicuous, but highly laboured, and somewhat diffuse. In Cicero's opinion it was he who first gave to prose writing its due rhythm. The art of Isocrates is always apparent, a circumstance which of itself diminishes in some degree the effect of his writings, and is almost inconsistent with vigor and force. The oration to Demonicus is an almost uninterrupted series of antitheses. Isocrates, though he falls far below the great orator of Athens, is still a perfect master in the style which he has adopted, and has well merited the high encomium of Dionysius for the noble spirit and the rectitude of purpose which pervade his writings. This judicious critic has thus briefly summed up his comparison between Lysias and Isocrates. 'As to the charm of composition, Lysias is superior to Isocrates in the same kind that a naturally handsome person is to one made so by art: the composition of Lysias pleases naturally; that of Isocrates aims at pleasing.' Plutarch says that sixty orations went under the name of Isocrates, of which only twenty-five or twenty-eight at most were his; twenty-one of these have come down to us, together with a few epistles, probably not genuine. 'Isocratis Opera,' Greek and Latin, were edited by the Abbé Auger, 3 vols. 4to., Paris, 1782, with several biographies of Isocrates: this edition is of small value. The best edition of the Greek text is by Bekker; the edition of Koray, Paris, 1807, 2 vols. 8vo., is useful. Isocrates was translated into English by Richard Sadleir, London, folio (no date); by Dinsdale, London, 1752, 8vo.; and by Gillies, together with the Orations of Lysias, London, 1778, 4to. (Dionysius of Halicarnassus; *Life of Isocrates*, attributed to Plutarch; Cicero, *De Claris Oratoribus*, c. 8; Quintilian, *Instit.* iii. x. &c.; Photius, *C.* 260.)

I'SODON. [CAPROMYS; MURIDÆ.]

ISOMERISM, a term suggested by Berzelius (from ἴσος, *equal*, and μέρος, *part*) to designate certain compounds which contain the same elements in the same ratio, and yet possess physical and chemical properties quite distinct. Berzelius has indeed employed three terms to include the different cases of bodies having the same composition and different properties; they are classed as *isomeric, polymeric,* and *metameric* substances.

Isomeric bodies are those which contain the same absolute and relative number of atoms of the same elements, and have consequently the same atomic weight. In this class are included the two states of peroxide of tin, of phosphuretted hydrogen, &c. &c. Professor Graham has however shown that the difference in the two oxides of tin is owing to one of them being a hydrate; and that the difference between the two phosphuretted hydrogens is derived from the presence of a very minute portion of an adventitious compound, which renders one of them spontaneously inflammable. The cyanic and fulminic acids are also classed as isomeric bodies, and it is admitted that cyanic acid is an oxide of cyanogen, but it is remarked by Professor Graham that we have no proof of the existence of cyanogen in fulminic acid, for though its elements are present in such proportions as to form it, they may be differently combined.

Should any real isomeric bodies be found, it is evident either that they must contain more than two elements, or two equivalents of one, if there be only two; thus supposing the two oxides of tin to have been really isomeric, they might be regarded as having their elements arranged so as to form a binoxide, SnO^2, or as a protoxide combined with oxygen, $SnO+O$; it is however exceedingly doubtful whether any such compounds exist.

Polymeric substances are those which contain the same relative but not the same absolute number of atoms of the same elements, and whose atomic weights are consequently unlike. Several carburets of hydrogen [HYDROGEN, *Carburetted*] offer examples of polymerism. Hatchetine, olefiant gas, and etherin are respectively solid, gaseous, and fluid, and they differ as much in their chemical relations as in their obvious properties; yet they all consist of six parts by weight of carbon, and one part by weight of hydrogen, which are the equivalent weights of these elements, or represent one atom of each.

It has been already mentioned that of two isomeric bodies which contain only two elements, one at least must be in double proportion, for no cause would otherwise appear to exist for their different forms and properties. If however, in the case of the hydrocarbons above cited, and such as are analogous, we suppose hatchetine to consist of one equivalent of each of its elements, olefiant gas of two, and etherin of four, their similarity of proportions is maintained though their quantities differ, and their elements may be so differently arranged as to cause the difference of properties which they are actually found to possess. Thus the one equivalent of hydrogen and carbon in hatchetine may be arranged $H+C$; the double quantities in olefiant gas $HHC+C$; quadruple proportions in etherine $HHHC+HCCC$. The first is a binary compound of elements; the second is constituted of a compound and an element; and the third of two compounds. Unless there were reasons for supposing etherin to consist of four equivalents of each of its elements, it might be imagined to result from a different arrangement of double elements, as $HCC+H$. With respect to olefiant gas, it actually happens that its combining weight is exactly double that of a simple carburet of hydrogen; for 36, or 1 equivalent of chlorine, unite with $14 = H^2C^2$, presumed to represent one equivalent of olefiant gas. [HYDROGEN, *Chloride of Hydrocarbon.*]

Metameric substances are those which, while they contain the same absolute and the same relative number of atoms of the same elements, yet constitute substances belonging to an entirely *different class* of bodies, or a *different order* of chemical compounds. For a list of metameric bodies, and further information on the subject, we refer to Professor Johnstone's statement (*Reports of the British Association*, vol. i.), from which we quote the following illustrative case:—cyanuric acid when heated, and without giving off or absorbing any thing, is wholly converted into hydrous cyanic acid; that is, it is changed from a compound atom of the first order, or from an oxide of a ternary radical, $\frac{1}{3}$ (Cy+2O+H), into a compound atom of the second order; into an acid chemically combined with water ($\dot{C}y+\dot{H}$). These two substances Berzelius calls metameric modifications of each other.

ISOMETRICAL PERSPECTIVE. [PERSPECTIVE.]

ISOMORPHISM (from ἴσος, *equal*, and μορφή, *form*). In the year 1819 it was found by Mitscherlich that certain substances which have the property of assuming the same crystalline form may be substituted for each other in combination without altering the form of the crystal. Thus crystals which have the aspect and form of alum, a salt which is well known to contain sulphate of potash and sulphate of alumina, may be made with sulphate of potash and persulphate of iron, hence it is concluded that alumina and peroxide of iron are isomorphous; and it is also found that the primary form of alumine or corundum is a rhomboid, which differs only a few degrees from that which is the primary form of peroxide of iron or specular iron ore.

The law of isomorphism, as announced by Mitscherlich in its utmost generality, is as follows: 'The same number of atoms combined in the same way produce the same crystalline form, and the same crystalline form is independent of the chemical nature of the atoms, and is determined only by their number and relative position.' This view has however been since abandoned by its author, and, as stated by Dr. Turner, his opinion now appears to be 'that certain elements which are themselves isomorphous, when combined in the same manner with the same substance communicate the same form;' and he proceeds to state, in illustration of this doctrine, that similarly constituted salts of arsenic acid and phosphoric acid yield crystals of the same figure, because the acids, it is thought, are themselves isomorphous; and as the atomic constitution of these acids is similar, each containing the same number of atoms of the other ingredient, it is inferred that phosphorus is isomorphous with arsenic.'

Several distinct groups of isomorphous bodies have been described by Mitscherlich; from these we shall select the salts of phosphoric and arsenic acids as examples: the neutral phosphate and the biphosphate of soda have exactly the same form as the arseniate and binarseniate of soda; phosphate and biphosphate of ammonia correspond with arseniate and binarseniate of ammonia; and the biphosphate and binarseniate of potash have the same form; each phosphate has a corresponding arseniate, possessing the same form, the same number of equivalents of acid, alkali, and water of crystallization, and differing only in the fact that one series contains phosphorus and the other an equivalent quantity of arsenic.

A list of isomorphous mineral groups is given by Professor Miller, of Cambridge, in the first volume, p. 118, of the 'Reports of the British Association;' and Professor Johnstone has published a list of isomorphous bodies arranged in their several groups, in p. 225 of the same volume, from which the annexed has been abbreviated by Dr. Turner.

1.

Silver	Ag.
Gold	Au.

2.

Arsenious Acid (in its unusual form)	As^2O^3.
Sesquioxide of Antimony	Sb^2O^3.

3.

Alumina	Al^2O^3.
Peroxide of Iron	Fe^2O^3.

4.

Salts of Phosphoric Acid	P^2O^5.
„ Arsenic Acid	As^2O^5.

5.

Salts of Sulphuric Acid	SO^3.
„ Selenic Acid	SeO^3.
„ Chromic Acid	CrO^3.
„ Manganesic Acid	MnO^3.

6.

Salts of Oxichloric Acid	Cl^2O^7.
„ Oximanganic Acid	Mn^2O^7.

7.

Salts of Potash	KO.
„ Ammonia with 1 eq. of water	H^4NO.

8.

Salts of Soda	NaO.
„ Oxide of Silver	AgO.

9

Salts of Baryta	BaO.
„ Strontia	SrO.
„ Lime (in Arragonite)	CaO.
„ Protoxide of Lead	PbO.

10.

Salts of Lime	CaO.
„ Magnesia	MgO.
„ Protoxide of Iron	FeO.
„ „ Manganese	MnO.
„ „ Nickel	NiO.
„ „ Zinc	ZnO.
„ „ Cobalt	CoO.
„ „ Copper	CuO
„ „ Lead (in plumbo-calcite)	PbO

11.

Salts of Alumina	Al^2O^3.
„ Peroxide of Iron	Fe^2O^3.
„ Oxide of Chromium	Cr^2O^3.
„ Sesquioxide of Manganese	Mn^2O^3.

The doctrine of isomorphism has been very generally received, yet the difficulties which attend it, and the liberties which some of its advocates have taken with what were previously regarded as the facts of chemical science, in order to support their theory, have prevented its universal adoption. Alluding to the supposed isomorphism of the arsenic and phosphoric acids, Mr. Brooke remarks, 'From other observations it appeared that barytes, strontian, and oxide of lead ought to be isomorphous; and hence that the salts of those substances, when produced by the same acid, ought also to be isomorphous.

But on examining the sulphates and acetates, it was discovered that their respective angular measurements were not alike, and they were ascertained therefore not to be strictly isomorphous. The sulphates are right rhombic prisms, and a corresponding dihedral angle of each afforded the following measurements:—

Sulphate of barytes	101° 42′
„ strontian	104°
„ lead	103° 42′

It became necessary therefore that the doctrine of isomorphism, in the strict sense of the term, should as a general principle be abandoned; and it is not unreasonable to conclude that the crystals which suggested the theory, and which appear to measure alike, may really differ in some small quantity which the goniometer does not detect.

But although the doctrine of isomorphism, or absolute *identity* of form, cannot be supported, it has been said that the forms in each respective case belong to the same *system of crystallization*, and they have therefore been termed *plesiomorphous* by Mr. (now Professor) Miller, of Cambridge, in a paper on some artificial crystals read to the Cambridge Philosophical Society, in March, 1830; and if ever the class of primary form can be indicated with certainty by the chemical composition of a crystallized body, a benefit will so far have been conferred on science by the the theory of M. Mitscherlich.' (*Phil. Mag. and Annals*, xi., 162.)

As connected with the subject of isomorphism, it will be proper to notice two other classes of bodies, which have been termed *dimorphous* and *isodimorphous* substances.

The case of dimorphism first ascertained was presented by carbonate of lime in the two incompatible crystalline forms of common calcareous spar and of arragonite. It was attempted to account for the difference by the fact that arragonite frequently contains a small portion of carbonate of strontia and of water; but it has since been found that these varying forms of carbonate of lime may be obtained artificially, and both in a pure state; thus when an alkaline carbonate is added to a cold solution of chloride of calcium, the carbonate of lime precipitated is analogous to calcareous spar; while that thrown down from a hot solution of the chloride is similar to arragonite.

It was also soon afterwards discovered that sulphur crystallized from fusion differs essentially in its form from the natural crystals and those deposited from bisulphuret of carbon. So also the diamond and graphite, which are both pure carbon, crystallize in forms which are incompatible with each other. A table of the dimorphous bodies at present known has been given by Professor Johnstone, in the *Seventh Report of the British Association.*

The term isodimorphous is proposed by Professor Johnstone to express the fact that two substances known to be dimorphous, the carbonates of lime and lead, crystallize each in two forms, the analogous pairs of which are also isomorphous.

In the paper above alluded to, Professor Johnstone has also given a table of isodimorphous groups.

ISOPERIMETRICAL. [VARIATION, CALCULUS OF.]

ISO'PODA, Latreille's name for the fifth order of crustaceans. These Isopods, according to that zoologist, approach the *Læmodipoda* by the absence of mandibular palpi (but see post, p. 56), though they are removed from them by several points; the two anterior feet are not annexed to the head, and, like the succeeding ones, depend upon their particular segment. The feet are always fourteen in number, unguiculated, and without any vesicular appendage at their base. The under part of the tail is furnished with appendages which are very apparent, and in the form of leaflets, or vesicular purses. Of these, the two first, or external ones, ordinarily cover the others, either totally or in great part. The body is generally flattened and wider than it is thick. The mouth is composed of the same pieces as in the crustaceans which precede it in M. Latreille's system, but in the order before us those which answer to the two superior jaw-feet in the *Decapods* present more the appearance of a lower lip terminated by two palpi. Two of the antennæ, the mesial ones, are almost obliterated in the last genera of this order, which are all terrestrial, and differ besides from the other by their respiratory organs. The male sexual organs are pointed out most frequently by the presence of linear or filiform appendages, and sometimes by hooks placed at the internal origin of the first subcaudal laminæ. The females carry their eggs under the breast, either between the scales or in a membranous pouch or sac that opens to afford a passage for their young, which are hatched with the form and parts proper to the species, and only cast their skin as they increase in size. The greater number live in the waters. Those which are terrestrial have need, like other crustaceans that live out of water, of a certain degree of atmospherical humidity, in order that respiration may be carried on, and that their branchiæ may be in a fit state for performing this function.

ORGANIZATION.

MM. Victor Audouin and Milne Edwards have given some most interesting particulars of the organization of the Isopods, the *Ligiæ* especially. (*Annales des Sciences Nat.*, August, 1827.) It appears from their observations that the *heart* has the form of a long vessel extended above the dorsal surface of the intestine. Its anterior extremity gives off three *arteries*, as in the *Decapods*. The lateral *branchiæ* may also be seen directed from the heart towards the feet. At the edge of the two first articulations of the abdomen, or tail, this organ receives, both right and left, small canals (the branchio-cardiac vessels) which seem to come from the branchiæ. According to the demonstrations of these zoologists in the case of the *Ligiæ*, it would appear that the *venous system* is less complete than in the *Macrurous Decapods;* and that the blood driven from the heart to the different parts of the body passes into *lacunæ*, which the organs leave between them at the lower surface of the body, and which have a free communication with the different vessels of the branchiæ. The *blood*, after having traversed the respiratory apparatus, returns to the heart in traversing the branchio-cardiacal vessels. This disposition would establish the passage from the circulating system of the *Decapod* crustaceans to that of the *Branchiopods*. According to Cuvier, the two anomalous chords composing the mesial part of the nervous system of the *Onisci* (and probably of the other *Isopods*, and even of the *Amphipods*) are not entirely approximated, and may be well distinguished throughout their length. There are nine ganglions, without counting the brain; but the two first and the two last are so approximated that they may be reduced to seven. The second and the six following furnish the nerves to the seven pairs of feet; the four anterior feet, although analogous in the order of succession of the parts to the four last jaw-feet of the *Decapods*, are really feet, properly so called. The segments which immediately succeed, or those that form the tail, receive their nerves from the last ganglion. These segments may be considered as simple divisions of a single segment, represented by that ganglion; and we accordingly see that the number of these posterior segments varies.

The following is the arrangement of M. Latreille:—

The order consists of six sections.

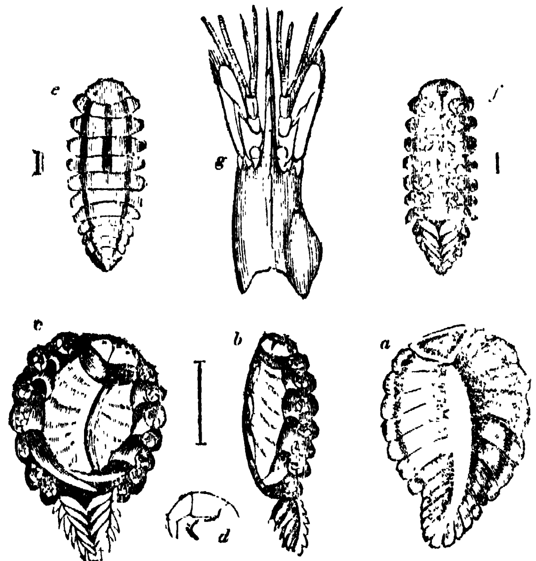
1. *Epicarides.* (Latreille.)

These are parasitical Isopods, which, according to M. Latreille, are without either *eyes* or *antennæ;* the males however have eyes, though the females are blind. The *body* is flat, very small and oblong in the males; but much larger in the females, taking, in their case, the form of an oval, which is narrowed and a little curved posteriorly, hollow below, with a thoracic border, divided on each side into five membranous lobes. On this border the *feet*, which are very small and unfit either for walking or swimming, are situated. The under part of the *tail* is furnished with five pairs of small ciliated imbricated leaflets, answering to as many segments, and disposed in two longitudinal rows; but the posterior extremity is deprived of appendages. The *mouth* presents distinctly only two membranous leaflets applied one upon the other, of the same consistence, and quadrilateral. The lower concavity, forming a sort of flat basket, is filled with eggs. Near the place of their issue is constantly found an individual, which is presumed to be the male; but M. Latreille adds, that the extreme smallness of its size seems to forbid the possibility of copulation. According to M. Desmarest, this individual is furnished with two eyes; its body is straight and nearly linear. One subgenus only belongs to this section.

Bopyrus. (Latreille.)

The most common species is *Bopyrus Crangorum.* Those who are in the habit of eating prawns will probably have observed a tumour occasionally presenting itself under the carapace on one of the sides, which is bulged out. On lifting this part of the shell, the parasite will, in such cases, be discovered immediately under it and upon the branchiæ. We have frequently detected the *Bopyrus*, but on whatever species of prawn it has been found, we have never remarked that the animal to which it adhered was more meagre than its fellows, though this perhaps may have arisen from the prawn not having been long subject to the visitation of the parasite. But there is another reason why the prawn should not suffer much from the adhesion of the parasite. The author of *Horæ Entomologicæ* informs us that he has lately found three specimens of *Bopyrus* (females) with their backs turned to the branchiæ of the prawns; and he is of opinion that they and other crustaceous parasites which adhere to the anterior parts of fishes and crustaceans fix themselves there for the sake of the currents (produced by the branchiæ in respiration), which bring with them the animalcules on which the parasites feed.

Bopyrus is found on *Palæmon serratus* and *Palæmon squilla*, but most frequently on the former. (See the paragraphs at the end of the account of *Serolis*.)



Bopyrus Crangorum.

a, The upper side; *b*, the animal seen in profile; *c*, the under side; *d*, one of the feet, much magnified (female); *e*, small individual, considered as the male, upper side; *f*, the same, lower side; *g*, carapace of a prawn deformed on the right side by the presence of *Bopyrus*. (Desmarest.)

M. Risso has described another species, under the female of which he states that he found eight or nine hundred living young ones. See further, Desmarest, *Considérations sur les Crustacés*, p. 324.

2. *Cymothoada.* (Latr.)

This section comprises those Isopods which have four

very apparent *antennæ;* these are setaceous, and nearly always terminated by a pluriarticulate stem. These crustaceans have *eyes*, a *mouth* of the ordinary formation (Latreille refers to the generalities of the *Malacostraca* with sessile eyes), vesicular *branchiæ*, disposed longitudinally in pairs, a *tail* consisting of from four to six segments, with a fin on each side, and the anterior *feet* most frequently terminated by a strong but small nail or hook. These Isopods are all parasitic according to Latreille; but *Serolis* appears not to be a parasite. Sometimes the eyes are mounted on tubercles at the summit of the head. The tail is composed of only four segments.

Serolis. (Leach.)

One species only known (*Cymothoa paradoxa* of Fabricius). *Antennæ* placed on two lines, and terminated by a pluriarticulate stem. Under the three first segments of the *tail* there are between the ordinary appendage three others, which are transverse and terminated posteriorly in a point.

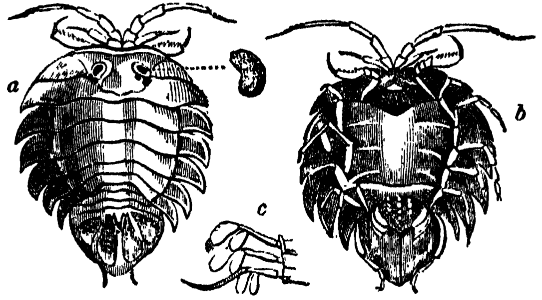
M. Desmarest describes the animal thus:—superior *antennæ* formed of four joints, larger than the three first of the inferior antennæ; the last joint composed of many others, and smaller. Inferior antennæ with five joints, the two first small; the third and fourth (principally this last) elongated; the fifth composed of many others, smaller. Second pair of *feet* having the penultimate joint enlarged and the nail or claw much elongated; the sixth pair ambulatory, rather spiny, and having the nail slightly curved. Anterior appendages of the belly, or *branchial laminæ*, formed of two equal parts, which are foliaceous, rounded at their extremity, furnished with hairs at their base, placed upon a common peduncle; the two posterior and lateral appendages small and narrow, especially the interior one, which hardly projects.

This is a very interesting animal, and has been considered to offer some resemblance at first sight to the extinct form of the *Trilobites.* M. Desmarest however remarks that it requires but a slight examination to prove that there is not the slightest resemblance between them.

Dr. Buckland, on the other hand, is of opinion that *Serolis* affords the nearest approach among living animals to the external form of Trilobites. The most striking difference, he observes, between this animal and the *Trilobites* consists in there being a fully developed series of crustaceous legs and antennæ in *Serolis*, whilst no traces of either of these organs have yet been discovered in connexion with any *Trilobite.* M. Brongniart, he adds, explains the absence of these organs by conceiving that the *Trilobites* hold precisely that place in the class Crustaceans (*Gymnobranchia*) in which the antennæ become very small or altogether fail; and that the legs, being transformed to soft and perishable paddles (*pattes*), bearing branchiæ, or filamentous organs for breathing in water, were incapable of preservation.

It is however by no means clear that we have in *Serolis* the nearest approach to those extinct crustaceans so interesting to the geologist and palæontologist. Do we not find a much nearer approximation in *Bopyrus?* Of this opinion is Mr. W. S. MacLeay, the author above quoted, who has perhaps studied the *Invertebrata* with a view to generalization more deeply than any living zoologist. The *Trilobites* exhibit no vestige of antennæ: *Serolis* has antennæ; *Bopyrus* has none; nor are we to forget the rudimentary legs of the latter. In accordance with this view the male of *Bopyrus* would represent a sort of *Bumastus* (Murchison, *Silurian System*), and the female an *Asaphus.* If this supposition be well founded, those forms among the Trilobites which systematists have separated specifically on the ground of the absence or presence of eyes, may be mere modifications arising from sexual difference; for nature makes nothing in vain; and the females of *Bopyrus* and *Cymothoa* have no eyes, because they do not require them, whilst the males do. Thus the cochineal-insect, when young and locomotive, has eyes; but the female, when fit for reproduction, becomes a fixture and is blind. So the Cirrhipeds in their youth are free and have eyes; in their adult state, when they are sessile, they lose organs which would be comparatively useless.

With regard to the observation of M. Brongniart, the softness of the texture of the *Nereidina* of MacLeay, and the perfection of the impression of *Nereites Cambrensis*, Murch. (pl. 27, *fig.* 1, of Mr. Murchison's work 'On the Silurian System of Rocks'), make it very remarkable, as Mr. MacLeay there observes, that if articulated feet existed in the Trilobites, some vestiges of them, even although membranaceous, should not come down to us more perfect than those figured by Goldfuss. [TRILOBITES.]

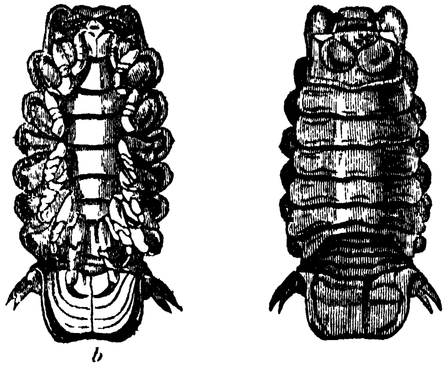


Serolis Fabricii. *a*, back; *b*, under surface, showing the union of crustaceous legs with the membranous branchiæ; *c*, magnified view of branchiæ.

Locality of the genus.—Tierra del Fuego, Straits of Magalhaens (Banks). Senegal (Dufresne). Captain Phillip Parker King, R.N., collected many specimens on the east coast of Patagonia, and also at Port Famine, in the Straits, where Capt. King saw the beach covered with dead specimens. He also observed them alive swimming close to the bottom among the sea-weed. They moved slowly and gradually, unlike a shrimp. He never saw them swimming near the surface: their legs seemed adapted for swimming and crawling on the bottom.

Cymothoa. (Fabr.)

Antennæ nearly equal in length; *eyes* but little apparent; last segment of the *tail* squared, and the two pieces terminating the lateral fins linear, equal, and styliform.



Cymothoa œstrum. *a*, upper side; *b*, lower side.

Ichthyophilus (Latr.; *Nerocila, Livoneca*, Leach).

Antennæ of equal length, and *eyes* not very visible; last segment of the *body* nearly triangular, with two pieces terminating the lateral fins, in form of leaflets or blades: the exterior of these is greatest in *Nerocila*, and of the same size as the others in *Livoneca.*

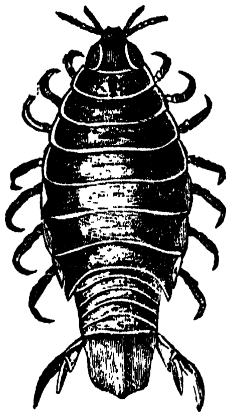
M. Latreille observes that in the four following subgenera the superior *antennæ* are manifestly shorter than the inferior.

Many, as well as the *Cymothoæ*, have all the *feet* terminated by a powerful and strongly arched nail (onglet); the last eight are not spiny; the *eyes* are always distant and convex. These, in the method of Dr. Leach, form three genera, but M. Latreille is of opinion that they may be united under one subgenus, namely,

Canolira (Leach; *Anilocra, Olencira*, of the same).

In those *Canoliræ* designated by Dr. Leach as *Olenciræ* the *blades of the fins* are narrow and armed with points. In those named by the same zoologist *Anilocræ* the external blade of the fins is longer than the internal one; the inverse of which is the case with the *Canoliræ*, in which, besides, the *eyes* are but very little granulated, while they are very sensibly granulated in *Anilocra.*

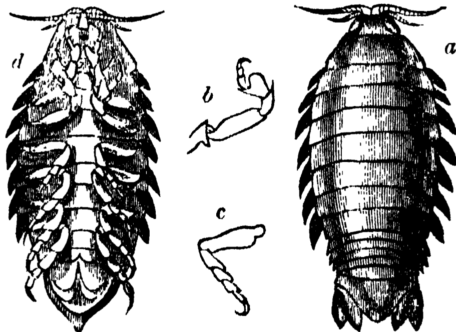
M. Latreille remarks that in the three following subgenera the second, third, and fourth *feet* only are terminated by a very strongly curved nail (onglet), and the eight last are spiny. The *eyes* ordinarily have but little convexity, and are large and converging anteriorly.



Canolira (Anilocra) Capensis.

Æga. (Leach.)

Two first joints of the superior *antennæ* very large and compressed.



Æga emarginata.
a, upper side; *b*, anterior foot; *c*, posterior foot; *d*, under side.

Rocinella. (Leach.)

Two first joints of the superior *antennæ* nearly cylindrical, but approaching the *Ægæ* in their large and anteriorly approximated *eyes*.

Conilira. (Leach.)

Antennæ as in *Rocinella;* but the *eyes* are small and distant; and the edges of the segments are nearly straight, and not falciform and prominent.

Synodus. (Latr.)

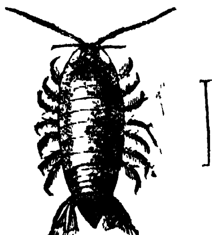
Antennæ upon two lines, lower *antennæ* always short, tail of six segments; distinguished from all the preceding by their great and projecting jaws. Only one species.

Cirolana. (Leach.)

Length of the lower *antennæ* surpassing the half of that of the body. Six segments in the *tail*.

Nelocira. (Leach.)

Length of lower *antennæ* as in *Cirolana*. Five segments only in the *tail*. *Cornea* of the eyes smooth.



Nelocira Swainsonii.

Eurydice. (Leach.)

Resembling *Nelocira* in the number of the caudal segments, but differing from that form in its granulous *eyes*.

M. Latreille is of opinion that this subgenus conducts us to those whose *eyes* are formed of small grains, or which have those organs smooth, and which have besides the four *antennæ* inserted upon the same horizontal line, consisting of four joints at most, all the *feet* ambulatory, and the *tail* composed of six segments. Such a form is

Limnoria. (Leach.)

The only living species known is *Limnoria terebrans*, which, although only two lines in length, is nevertheless highly injurious in consequence of its multiplication and its habits. The rapidity with which this crustacean pierces the timber of ships makes its attacks not only mischievous but alarming. It rolls itself up like a wood-louse when it is seized; and is a native of the European Seas.

3. *Sphæromides.* (Latr.)

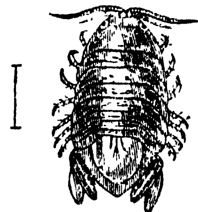
The Isopods composing this section have four very distinct *antennæ*, which are either setaceous or conical; and, with the exception of *Anthura*, they are always terminated by a stem divided into many small joints, and short. The lower antennæ, which are always the longest, are inserted under the lower part of the first joint, which is large and thick. The *mouth* has the usual form. The *branchiæ* are vesicular or soft, naked, and disposed longitudinally in pairs. The *tail* has only two complete and moveable segments, but has often impressed transverse lines upon it, indicating the vestiges of other segments. On each side of its posterior extremity is a fin terminated by two leaflets, the lower of which is moveable, while the upper one is formed by an internal prolongation of the common support. The *branchial appendages* are curved internally; the internal side of the first is accompanied in the males by a small linear and elongated piece. The anterior part of the *head*, situated below the *antennæ*, is triangular, and in the form of a reversed heart. Some have an oval or oblong *body*, contracting ordinarily into the form of a bowl. The *antennæ* are terminated by a pluriarticulate joint, and the lower ones at least are sensibly longer than the head. The lateral and posterior fins are formed of a peduncle and two blades, composing, together with the last segment, a fan-like fin. In these the impressed and transverse lines of the anterior segment of the *tail*, always shorter than its successor, or the last, do not reach the lateral borders. The first joint of the superior antennæ is in the shape of a triangular battledore (palette). The *head* seen from above forms a transversal square. The leaflets of the fins are very much flattened, and the intermediate piece, or last segment, is enlarged and rounded laterally.

Zuzara. (Leach.)

Leaflets of the *fins* very large, the upper of which is shortest, separated from the other to form a border to the last segment.

Sphæroma. (Latr.)

Leaflets of moderate size, equal, and applied one over the other.



Sphæroma dentata.

In others the impressed lines, or transverse sutures of the anterior segment of the *tail*, attain the lateral border and cut it. The first joint of the superior *antennæ* forms an elongated *palette*, which is square or linear. The leaflets of the *fins* are ordinarily narrower and thicker than in the preceding: the exterior sometimes (as in *Cymodocea*) envelops the other: their point of junction resembles a knot or joint. Sometimes the sixth segment of the *body* is sensibly longer than the preceding segments and the succeeding one. One of the leaflets of the fins only is projecting.

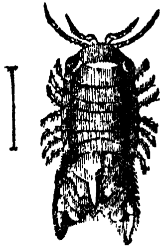
Næsa (Campecopæa, Leach).



Næsa bidentata.

Sometimes the sixth segment of the *body* is of the length of the preceding segments, and of the succeeding one, as in

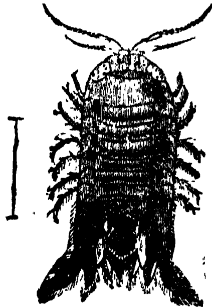
Cilicœa, where one of the leaflets of the fins only is projecting, the other leaning against the posterior border of the last segment.



Cilicœa Latreilli.

Cymodocea. (Leach.)

In this form the leaflets of the *fins* are projecting and directed backwards. The sixth segment is not prolonged posteriorly, and the extremity of the last segment has a small blade in a notch.



Cymodocea Lamarckii.

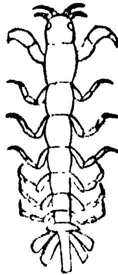
Dynamene.

Resembling *Cymodocea* in the projection and direction of the leaflets of the fins, but having the *sixth segment* prolonged backwards, and the last with a simple slit only, there being no blade.

Others again, as

Anthura,

have a vermiform *body*, and the *antennæ*, hardly so long as the head, consisting of four joints. The leaflets of the posterior *fins* form by their disposition and approximation a sort of capsule. The anterior *feet* are terminated by a monodactyl claw.



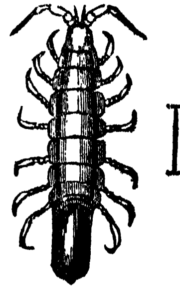
Anthura Gracilis, magnified.

4. *Idoteidæ*. (Leach.)

This section consists of Isopods whose *antennæ* are four in number, but upon the same horizontal and transverse line; the lateral ones are terminated by a stem ending in a point, gradually decreasing and pluriarticulate; the intermediate antennæ are short, filiform, or a little the largest towards the end, and four-jointed, none of the joints being divided. The conformation of the *mouth* is the same as in the preceding sections. The *branchiæ* are in the form of bladders, white in the greater part, susceptible of being blown up, capable of aiding in swimming, and covered by two blades or valvules of the last segment, adhering laterally to its borders, longitudinal, biarticulate, and opening in the middle by a straight line, like a folding door. The *tail* is formed of three segments, the last of which is much the largest, without appendages at the end or lateral fins. These crustaceans are all marine.

Idotea. (Fabr.)

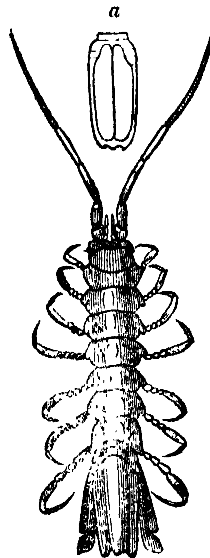
All the *feet* strongly unguiculated and identical; the *body* oval or simply oblong, and the lateral *antennæ* shorter than the half of the body.



Idotea tricuspidata.

Stenosoma. (Leach.)

Differing from *Idotea* in the linear form of the *body* and the length of the *antennæ*, which surpasses the half of that of the body.



Stenosoma lineare, natural size. *a*, laminæ of the under part of the abdomen.

Arcturus. (Latr.)

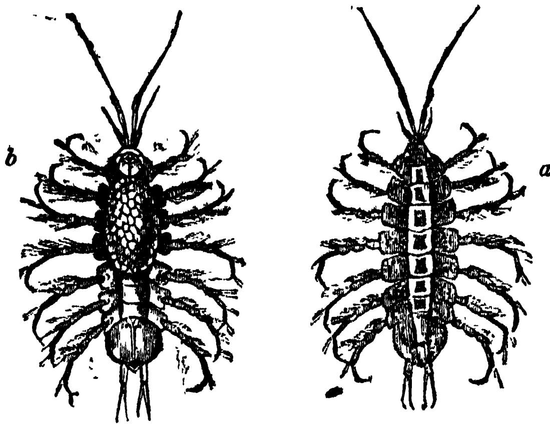
Very remarkable for the form of the second and third *feet*, which are directed forwards, and terminate by a long bearded joint, unarmed or feebly unguiculate; the two anterior feet are applied upon the mouth and unguiculated; the six last are strong, ambulatory, thrown backwards, and bidentated at their extremity. In the length of the *antennæ* and form of the body *Arcturus* approaches *Stenosoma*. M. Latreille (1829) says that he never saw but one species, *Arcturus tuberculatus*, brought home from the North Seas by one of the last English expeditions to the North Pole.

5. *Asellota*. (Latr.)

The fifth section consists of Isopods with four very apparent *antennæ* which are disposed on two lines, and are setaceous and terminated by a pluriarticulate stem. There are two *mandibles*, four jaws, ordinarily covered by a species of lip formed by the first *jaw-feet*. The *branchiæ* are vesicular, disposed in pairs, and covered by two longitudinal and biarticulate but free leaflets. The *tail* is formed of a single segment, without lateral fins, but with two bifid needle-like processes, or two very short appendages in the form of tubercles, at the middle of its posterior border. There are other lamellar appendages situated on its inferior base, more numerous in the males than in the females, and these serve to distinguish the sexes.

Asellus. (Geoffroy.)

Two bifid needle-like processes at the posterior extremity of the *body*; *eyes* distant; superior *antennæ* at least as long as the peduncle of the inferior antennæ. Hooks at the end of the feet entire



Asellus aquaticus (Idotea aquatica, Fabr.), female, magnified. *a*, upper side; *b*, under side.

This is very abundant in fresh stagnant waters, as in the pools about Paris. It moves slowly when not terrified. In the spring it comes forth from the mud, in which it has passed the winter. The male, which is much larger than the female, carries her about for a space of eight days, holding her by means of his fourth pair of feet. When he quits her, she is pregnant with a great number of eggs, enclosed in a membranous sac placed under her breast, and opening by a longitudinal slit to give passage to the young.

Oniscoda. (Latr.)

These, the *Janiræ* of Dr. Leach, differ from the *Aselli* in the approximation of their *eyes*, in having their superior *antennæ* shorter than the peduncle of the inferior ones, and in the hooks of the *tarsi*, which are not bifid. M. Latreille remarks that the only species known (*Janira maculosa* of Leach) has been found on the coasts of England among the sea-weeds and *Ulvæ*.

Jæra. (Leach.)

This form, in the place of the needle-like processes (stylets) at the end of the *tail*, has only two tubercles. M. Latreille remarks that only a single species, *Jæra albifrons*, Leach, has been found, and that it is very common on the English coast, under stones and among the sea-weed.

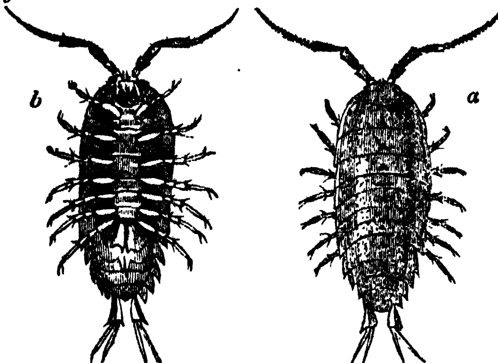
6. Cloportides, *Oniscidæ*. (Latr.)

This, the last section of Isopods, according to the arrangement of M. Latreille, consists of those forms which have indeed four *antennæ*, but the two intermediate ones are very small, little apparent, and consist of two joints at most: the lateral antennæ are setaceous. The *tail* is composed of six segments, with either two or four needle-shaped appendages at the posterior border of the last segment, and without lateral fins. Some are aquatic, others terrestrial. In the latter, the first leaflets below the *tail* exhibit a row of small holes, where the air penetrates to the organs of respiration there enclosed.

Some have the sixth joint of their *antennæ*, or their stem, so composed that in counting the small articulations of this part the total number of all the joints is nine at least. These are marine, and consist of two subgenera.

Ligia. (Fabr.)

Stem of the lateral *antennæ* composed of a great number of small joints, and two very projecting *stylets*, separated at the end into two branches, at the posterior extremity of the *body*.



Ligia Oceanica, nat. size. *a*, upper side; *b*, under side.

This is very common on the sea-coast, where it may be seen creeping on the rocks or on sea-walls. When an attempt is made to seize it, the animal quickly folds its feet and lets itself drop.

Tylos. (Latr.)

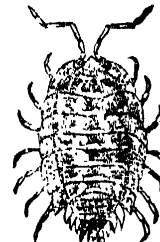
These seem to have the faculty of rolling themselves up. The last segment of the body is demicircular, and exactly fills the notch formed by the preceding. The posterior appendages are very small and entirely inferior. The *antennæ* have only nine joints, the four last of which compose the stem. On each side is a tubercle representing one of the intermediate antennæ; the intermediate space is elevated. The *branchiæ* are vesicular, imbricated, and covered by laminæ. Example, *Tylos Armadillo*. Locality, Mediterranean.

Philoscia. (Latreille.)

Lateral *antennæ* divided into eight joints and exposed at their base. The four posterior appendages nearly equal. These occur in moist places. Example, *Oniscus sylvestris*, Fabr.

Cloportes, properly so called; Oniscus, Linn. (Wood-Lice).

Eight joints to the lateral *antennæ*, but their base is covered; and the two external appendages of the *tail* are much larger than the two internal ones. These animals frequent dark and retired places, such as caves, cellars, holes in walls, &c., and are also found under stones and old logs. Their food consists of decayed vegetable and animal substances; and they scarcely ever come forth from their retreats except in rainy or moist weather. They move slowly when not in danger. The *eggs* are enclosed in a pectoral pouch. The young at their birth have a thoracic segment short, and consequently only twelve feet. These crustaceans were formerly used in medicine; but they no longer form part of the *materia medica*.

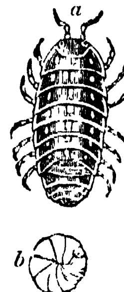

Oniscus murarius.

Porcellio. (Latr.)

Distinguished from the true wood-lice by the number of joints of their lateral *antennæ*, which are only seven. In other respects *Porcellio* resembles *Oniscus*.

Armadillo. (Latr.)

The posterior appendages of the *body* are not projecting; the last segment is triangular. A small blade, in form of a reversed triangle, or more large and truncated at the end, formed by the last joint of the lateral appendages, fills up on each side the void between the segment and the preceding. Lateral *antennæ* with only seven joints. The upper *subcaudal scales* are pierced with a row of small holes.



Armadillo pustulatus. *a*, expanded; *b*, rolled up.

Such is the arrangement of M. Latreille.

Lamarck divided the *Isopoda* into two great sections: the first consisting of those Isopods which have the *branchiæ* situated under the *tail*, and comprising two subdivisions; the second composed of those which have their *branchiæ* placed under the anterior part of the *abdomen*, between the *feet*.

Under the first he arranged the genera *Armadillo*, *Onis-*

cus, Philoscia, Ligia, Asellus, Idotea, Sphæroma, Cymothoa, Bopyrus, Typhis, Anceus, Praniza, Apseudes, Ione.

Under the second he included the genera *Leptomera, Caprella,* and *Cyamus.*

M. Desmarest divided the *Isopoda* into two great sections, with many subdivisions.

His first section, which he makes equivalent to the *Phytibranchiate Isopods* of Latreille, consists of the genera *Typhis, Anceus,* including *Gnathia* of Leach, *Praniza, Eupheus,* and *Ione.*

His second section, which he makes equivalent to the *Ptérygibranches* of Latreille, comprises the genera *Idotea, Stenosoma, Anthura, Serolis, Campecopea, Næsa, Cilicæa, Cymodocea, Dynamene, Zuzara, Sphæroma, Eurydice, Nelocira, Cirolana, Conilera, Rocinella, Æga, Canolira, Anilocra, Olencira, Nerocila, Livoneca, Cymothoa, Limnoria, Asellus, Janira, Jæra, Ligia, Philoscia, Oniscus, Porcellio, Armadillo,* and *Bopyrus.*

M. Milne Edwards (edition of Lamarck, 1838) states, in a note to that part of Lamarck's definition of an Isopod crustacean, '*mandibules. sans palpes,*' that Lamarck, Latreille, and most authors are in error when they assign this character to the Isopods, for in a great number of these crustaceans the mandibles are provided with a palpiform stem, entirely resembling that which may be seen in the greater part of the *Amphipoda.*

He further remarks that the respiratory lamellæ situated under the abdomen are hardly ever *branchiæ,* properly so called, but only one of the branches of the *false feet* become membranous and vascular, as in one of the appendages of the *thoracic feet* in the *Amphipoda.* The female of *Ione,* he observes, exhibits an exception, for she carries ramose *branchiæ* on each side of the abdomen.

M. Milne Edwards, in his notes, further states that those crustaceans whose respiratory appendages are placed under the *thorax* (which Lamarck calls *abdomen*) ought not to remain in the order of *Isopoda,* but belong to the *Læmodipoda* of M. Latreille. The *egg-pouch* he describes as being formed of the flabelliform appendages, which have become foliaceous, and are raised against the sternum.

The same acute zoologist (*loc. cit.*) says that the *Isopoda,* properly so called, are *Edriophthalmous crustaceans,* whose abdomen is never rudimentary, and carries below five pair of false *branchial feet,* having all nearly the same form and the same functions. The appendages of the penultimate ring (or the false feet of the sixth pair) have a form and use different from those of the preceding. The *thorax,* composed in general of seven rings, but sometimes having only five, carries nearly always seven pair of feet, which are often furnished with a foliaceous palp, serving to protect the eggs and young, but they hardly ever carry a vesicular appendage proper for respiration, as in the *Amphipoda* and *Læmodipoda.* Finally, the conformation of their buccal apparatus varies, and the greater part of authors are in error when they assign to them as a character the possession of mandibles deprived of palpiform appendages.

M. Milne Edwards is of opinion that the *Isopoda* form three natural families, namely, the *Idoteidians,* the *Cymothoadians,* and the *Cloportidians,* and he thus distinguishes them.

A. Jaw-feet operculiform, and deprived of a palpiform stem, or only showing the vestiges of it.

* Thoracic feet ambulatory; last segment of the abdomen smaller than the preceding segments; internal antennæ rudimentary.

These form the family of

Cloportidians.

* Thoracic feet anchor-like (ancreuses), last segment of the abdomen nearly always much larger than the preceding segments; internal antennæ in general well developed.

These form the family of

Cymothoadians.

AA. Jaw-feet palpiform. Last abdominal ring much more developed than the preceding ones; all or nearly all the feet ambulatory.

These form the family of

Idoteidians.

In this classification, says the author, the family of the *Cloportidians* has the same limits as in the method adopted by Lamarck, and comprises the *Terrestrial Isopods.*

The family of *Cymothoadians* is composed of the *Parasitic Isopods,* and comprehends *Cymothoa* of Lamarck, *Ione, Anceus,* and *Typhis.*

The family of *Idoteidians* consists of *Marine Isopods not Parasitic,* and embraces the genera *Idotea, Sphæroma, Anthura, Asellus,* &c.

Our limits will not allow us to go further into the valuable observations of M. Milne Edwards; and we must refer the reader to the fifth volume of the new edition of Lamarck for them. His highly interesting work, *Histoire Naturelle des Crustacés,* has not yet proceeded so far as the *Isopoda,* but we learn from it that he places them, together with the *Amphipoda* and *Læmodipoda,* under the legion of *Edriophthalmia.* [CRUSTACEA, vol. viii., p. 197.]

FOSSIL ISOPODA.

M. Latreille states that Professor Germar had sent to M. le Comte Dejean the figure and description of a small fossil crustacean which appeared to him (M. Latreille) to be referrible to the subgenus *Limnoria;* and he further remarks that *Oniscus prægustator,* figured in Parkinson's work, comes near to that species, or at least appears to belong to the same section.

M. Desmarest (*Histoire Naturelle des Crustacés Fossiles*) enumerates two fossil species of the genus *Sphæroma:* one, *Sphæroma antiqua,* found in a fragment of white, fine-grained calcareous stone, analogous in that respect to the Pappenheim stone, but of which he knows not the origin; the others, *Sphæroma Margarum,* from the horizontal beds of green fissile marl (*marne verte fissile*) at Montmartre, above the gypseous beds, mingled with *Spirorbes.*

The reader will find the TRILOBITES treated of in that article.

ISOPYRE, a mineral which occurs amorphous in granite. Fracture flat, conchoidal. Brittle. Hardness, 5·5 to 6. Colour velvet or greyish-black, occasionally dotted with red. Colour of streak greenish-grey. Slightly obeys the magnet. Lustre vitreous, Opaque or slightly translucent. Specific gravity 2·9 to 3. It is with difficulty acted upon by acids. Fuses before the blowpipe. It occurs in the granite of St Just, near Penzance, in Cornwall. According to Turner's analysis, it consists of

Silica	47·09
Alumina	13·91
Lime	15·43
Peroxide of iron	20·07
Oxide of copper	1·94
	98·44

ISO'SCELES (ἴσος, equal, σκέλος, leg), a term applied to a triangle of which two sides (or legs) are equal.

ISOTHERMAL LINES are curves supposed to be traced on the surface of the earth so that each may pass through a series of points at which the mean annual temperature is the same. The situations of such points were first determined by M. Humboldt from the registers of observed temperatures in Europe, and from the numerous observations made by himself and other travellers in different regions of the world. A full account of the researches of this philosopher respecting the temperature of the atmosphere and the law of its variations, in connection with the subject of this article, is contained in the third volume of the 'Mémoires d'Arcueil;' and also in the 'Annales de Chimie et de Physique,' tom. v.

Curve lines connecting points of equal temperature in the interior of the earth have been called *Isogeothermal lines.*

The temperature of the air in any region depends on the inclination of the sun's rays to the surface of the earth in that region, on the distribution of land and water, on the state of the countries from which come the prevailing winds, on the vicinity of the sea, the elevation of the land, and numerous other circumstances; and the complexity of the subject is such as to render vain any attempt to assign a law for the actual heat at a given place. The mean annual temperatures of places remain however nearly constant, and their decrease, in going from the equatorial regions towards either pole, approaches near enough to uniformity to encourage the expectation that the precise law of that decrease may one day be discovered.

Professor Mayer of Göttingen appears to have been the first who attempted, from such observations as existed in his time, to express the law by a formula. He made the temperature on any parallel of terrestrial latitude to depend on

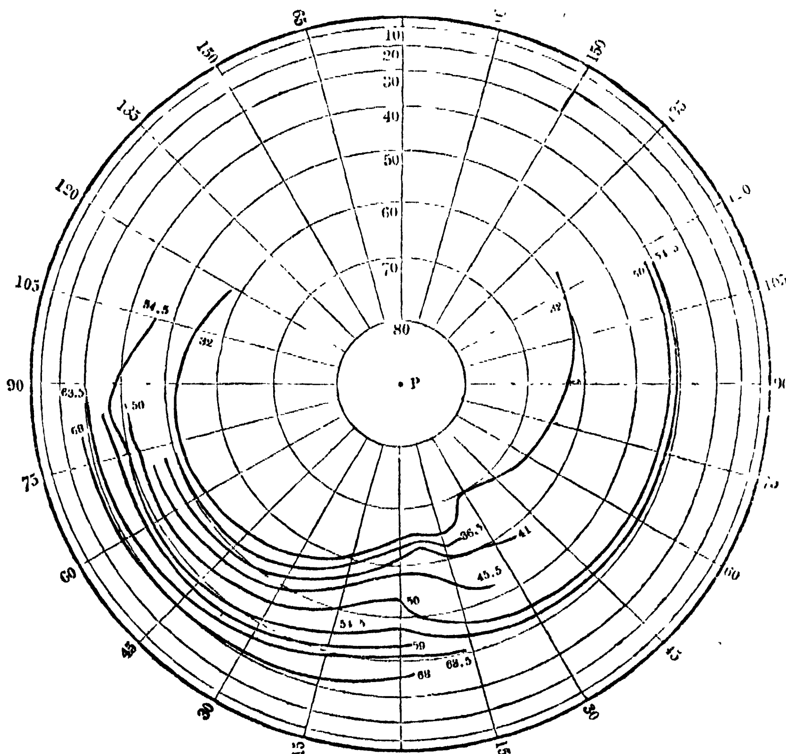
the square of the cosine of the latitude, and with some modifications this law is even now generally admitted. At the level of the sea the value of the mean annual temperature is expressed by $M + E \cos. 2L$; where L is the latitude of the place, M is the mean temperature on the parallel of 45°, and $M + E$ is that at the equator; and Professor Playfair has from this expression deduced a formula for temperature which includes the season of the year and the elevation of the place above the sea: he admits however that it agrees only with the Atlantic Ocean and the western part of the Old Continent. (*Outlines of Nat. Phil.*, 'Pneumatics.')

In the northern hemisphere, as we proceed eastward and westward from the meridians of Greenwich or Paris, it is found that the mean temperature of any parallel becomes continually less, and the severity of the winter greater than in this part of the world; the difference appears to attain a maximum at the eastern extremity of Asia, and one still higher in the central parts of North America. From a comparison of observations Humboldt found that between the parallels of 28° 25′ N. and 41° 53′ N. the difference between the latitudes of a place in Europe and a place in North America, having the same mean temperature, is about 7 degrees; and that the difference between the mean temperatures of two places having the same latitude in Europe and North America is 4·1° of Fahrenheit's thermometer.

In order to ascertain with the utmost possible precision the mean temperature of any place from the tables there kept, Humboldt divided the sum of all the temperatures observed in each day at intervals of one hour by the number of observations; and the sum of all these mean daily temperatures being divided by 365, gave the mean annual temperature. And in determining the series of points for his lines of equal temperature, when there existed no observations on which he could depend, he interpolated the temperature and geographical position between the values of those elements at two or more places where they were well known.

The period during which a traveller remains in any one place will seldom allow him to make a sufficient number of observations for determining its mean annual temperature by the process above mentioned; and therefore it may be useful to know that, according to Humboldt, the mean temperatures for the months of October and April are very nearly equal to the annual mean temperature; also that the half sum of the temperatures at sun-rise and at 2 P.M. is nearly equal to the mean temperature for the day. It may be proper to remark also that travellers, in making observations relating to temperature, should be careful to place their thermometers at some distance above the surface of the ground, and in situations where they may be unaffected by the reflection or radiation of heat from buildings or from terrestrial particles in the atmosphere. The very high temperatures which have been occasionally observed in sandy deserts are probably owing in part to the latter circumstance.

The following diagram represents an orthographical projection, on the plane of the equator, of the principal meridians and parallels of latitude in the northern hemisphere of the earth; and the strongly marked curves represent the nine isothermal lines whose forms have been determined by Humboldt. Their distances from one another are such as correspond on the earth to a change of mean annual temperature equal to 2·5 degrees of the centigrade thermometer (4·5° of Fahrenheit), and the most northern curve is that on which the mean temperature is expressed by zero on the former, or 32° on the latter scale. The number on each curve in the diagram expresses, according to Fahrenheit's thermometer, the mean annual temperature, at the level of the sea, of all the places through which the curve passes. The centre P represents the pole of the earth, and the longitudes of the meridian lines are numbered eastward and westward from the meridian of Greenwich.



The isothermal line of 32° passes about 4 degrees southward of Nain, a Moravian settlement on the coast of Labrador; and, continuing eastward through a point about 1 degree north of Umea in Sweden, it there makes a remarkable inflexion. After ascending as high as North Cape in Lapland it abruptly returns southward, and attains its lowest limit in the eastern parts of Asia. Proceeding westward from Labrador recent observations have shown that the curve descends towards the south and crosses the lower extremity of Hudson's Bay, from whence it again tends northwards to the Great Slave Lake. The positions of the other curves seem to be influenced in some measure by that which has been just mentioned. In their progress from the western coast of Europe to the eastern coast of America they incline towards the terrestrial equator, yet so that the southern curves approach very near to parallelism with that great circle of the earth. Within the territory of the United States they assume a form which is convex

to the equator, and farther west they appear to re-ascend towards the north. At about 10° eastward of the meridian of Greenwich the curves have their convexities turned northwards; and farther eastward they descend towards the equator, but the want of accurate observations in Asia renders their course in that part of the world rather uncertain. The isothermal line of 54·5° alone has been traced nearly round the earth: commencing at the mouth of the Columbia, on the western coast of North America, it passes near the city of Washington with its convexity towards the south; and after crossing the Atlantic it runs through Bordeaux, from whence it continues to the city of Pekin, at which place it again becomes convex towards the equator. It may be added that by the late voyages into the Arctic seas two points have been determined in the isothermal curve of 17°, which appears to pass through Spitzbergen in lat. 78° N., and through Melville Island in lat. 65° N.

But in every country the mean temperature varies with the height of the place above the level of the sea; and Humboldt, from observations made as well on the Cordilleras as in Europe, having determined that at every 100 metres of elevation (or 328 English feet) the mean temperature of the air is diminished by a quantity equal to that diminution which is consequent on an augmentation of latitude equal to one degree, calculated a table of the corrections which should be made in the curvatures of the isothermal lines at the level of the sea, in order to obtain the forms of those which appertain to points at any given elevation. According to Playfair the diminution of heat on ascending in the atmosphere is, near the surface of the earth, at the rate of 1° (Fahr.) for every 270 feet; but Mr. Atkinson, in the 'Memoirs of the Royal Astr. Soc.,' vol 2, from a comparison of many observations, makes the diminution equal to 1° for every 251·5 feet. He has also shown that the differences of temperature between summer and winter begin to diminish at the height of about 21,000 feet above the surface of the earth.

The differences between the mean summer and mean winter temperatures are very considerable at places whose mean annual temperature is the same; and these differences are not equal in the Old and New Continent. On the isothermal line of 32° in Europe, that difference is equal to 39·6°, and in America to 54°; and on the isothermal line of 68° the differences are respectively 21·6° and 27°. It has also been remarked that the differences between summer and winter are least near the northern, and greatest near the southern bends of the curves.

The curves formed by connecting, on the isothermal lines, points at which the mean temperature of summer is the same are called *isotheral* lines; and those formed by connecting points at which the mean winter temperature is the same are called *isocheimal* lines: both these systems of lines deviate more than the isothermal lines from the parallels of terrestrial latitude.

It was long supposed that the mean temperature of the southern was much lower than that of the northern hemisphere. In fact, in the Arctic seas, large masses of floating ice are not found below the 70th degree of latitude, and permanent fields exist only beyond the latitude of 75 or 80 degrees; while in the Antarctic regions ice is found in both states between the 54th and 59th degrees of latitude: and the island of Georgia, which is there situated, is perpetually covered with snow down to the sea-shore; whereas in the northern hemisphere this circumstance does not take place till we arrive at the parallel of 80°. [CLIMATE.]

The vast extent of the Antarctic seas, the absence of great tracts of land in those regions, and the pointed forms of the African and American continents, allow the currents to carry far northwards the ices of the southern pole; and thus a considerable degree of cold is produced at particular places. But the observations which have, within a few years, been made on the temperature of the southern regions, afford good reason to believe that there is little difference between the mean annual temperatures of places similarly situated in the two hemispheres. Near the equator, as might be expected, the mean temperatures in both are the same: those of the Isle of France and of Jamaica are 80·1°; the mean temperatures of Port Jackson, the Cape of Good Hope, and Buenos Ayres (66·7° to 67·5°), correspond to those of Natchez, Funchal, Algiers, and Cairo (64·8° to 72°). The mean temperature of the Malouine or Falkland Isles is 47·3°; at an equal latitude it is in Europe about 50°, and in America 36°; and the mean temperature of Van Diemen's Land is about the same as that of Italy. M. Humboldt concludes that, as far as the parallels of 40° or 50° of latitude, north and south, the corresponding isothermal lines are nearly equally distant from the equator; and with respect to America the mean annual temperature is greater in the southern than in the northern hemisphere. The variations between the mean temperatures at the opposite seasons of the year are much less in the former than in the latter at corresponding latitudes; in Van Diemen's Land the winters are said to be milder than at Naples, where the mean winter temperature is 46°, while the summers are colder than at Paris, where the mean summer temperature is 64·6°. And at Port Jackson the mean winter temperature (= 56·8°) corresponds to that of Cairo, while the mean summer temperature (= 77·4°) is equal to that of Marseilles.

M. Humboldt considers the mean annual temperature at the equator, at the level of the sea, to be equal to 81°·4 (Fahr.); but Mr. Atkinson (*Mem. of the Royal Astr. Soc.*, vol. ii.) found, by applying the method of least squares to equations formed from the data furnished by that philosopher himself, and assuming the temperature to vary, first as the square of the cosine, and then as $\cos.^{\frac{3}{2}}$ of the latitude, that the mean temperature there is at least equal to 84·5°. It is right to observe however, that Humboldt, in a paper published in the 'Annales de Chimie' for Sept., 1826, objects to the conclusions of Mr. Atkinson, and adheres to his own determination. Dr. (now Sir David) Brewster, in the sixth volume of the 'Edinburgh Journal of Science,' by a reduction of observations made at Ceylon, and assuming the temperature to vary according to the law of Mayer, finds 80·99° for the mean equatorial temperature.

An inspection of the isothermal curves, and particularly that of 32° in the above diagram, will sufficiently show that the mean temperature of the terrestrial pole cannot be obtained from any simple formula in which the variations are made to depend on the geographical latitudes of places. And in fact Captain Scoresby, using the formula of Mayer, and subtracting from the result a correction which he conceived to be due to the frigorific influence of the ice, made the mean temperature at the pole equal to 10° (Fahr.). From the observations of Captain (Sir Edward) Parry it appears that such temperature there must be lower than 3° below the zero of the scale. Sir D. Brewster has been led, from the form of the curves, to adopt the hypothesis of two polar points at which the mean temperature is a minimum: he places both of these on the parallel of 80° N. lat., but one of them is supposed to be situated in 95° E. long., with a mean temperature equal to + 1°, and the other in 100° W. long., with a mean temperature equal to − 3·5°; and, by inductions from observations, he has given, for the mean temperature at any place, the formulæ

$$81·8° \sin. D + 1°,$$
$$86·3° \sin. D - 3·5°;$$

where D is the distance of the place from the nearest pole.

By comparing the mean temperature at Van Diemen's Land with that at the Cape of Good Hope, the same philosopher concludes that in the Antarctic regions there are two points of maximum cold, whose situations correspond to those in the northern hemisphere. But it is evident that observations must be greatly multiplied in both hemispheres before the data can be considered sufficient for the determination of the isothermal equator or poles; or to serve as a foundation for the construction of formulæ for temperature in which full confidence may be placed.

In the 'Edinburgh Phil. Trans.,' 1820, Brewster has expressed the interesting idea that some connexion exists between the isothermal and the magnetic poles of the earth; in which case the revolutions of these last may produce corresponding revolutions in the others, and thus may serve to explain that augmentation of temperature which is supposed to have taken place in the west of Europe since the days of Cæsar and Ovid.

ISPAHAN. [PERSIA.]

I'SPIDA. [KINGFISHERS.]

ISRAEL, TRIBES OF. [JEWS.]

ISSOIRE. [PUY DE DOME.]

ISSOUDUN, a town in the department of Indre in France, on the River Theols, a tributary of the Arnon, which flows into the Cher; in 46° 57′ N. lat., 1° 59′ E. long.; about 130 miles in a direct line south by west of Paris, or 150 by the road through Montargis and Bourges. This town is

first noticed in the time of Louis IV., *Outremer* (A.D. 936-954). In the twelfth century it was under the dominion of lords of its own, to whom is ascribed the erection of its castle, of which only a large tower remains. In A.D. 1220 it was taken by Philippe II. *Auguste* from the English, and added to the domains of the crown. In the religious wars of the sixteenth century it came into the hands of the League, but A.D. 1589 the inhabitants drove them out. The town lost many inhabitants by the revocation of the edict of Nantes.

Issoudun is in a fertile tract, and is partly on the slope of a hill. The streets are broad and the houses built with tolerable regularity. There are four churches, two hospitals, a high-school, and a theatre. The population was, in 1831, 11,664; in 1836, 11,654: the inhabitants manufacture woollen cloth, linen, hosiery, earthenware, parchment, and leather; they trade in wine, wool, corn, and cattle: there are ten fairs in the year for cattle.

Issoudun is the capital of an arrondissement which comprehends 459 square miles, and had in 1836 a population of 47,572; it contains 4 cantons and 49 communes.

ISSUE is an ulcer artificially formed for the purpose of maintaining a constant purulent discharge from the body. It is usually made by placing one or more beads or peas on an incision through the integuments in one of the limbs, or in the neighbourhood of a diseased part, and there retaining them by adhesive plaster, so as to prevent the wound from healing, and keep it in a constant state of suppuration. Other issues are made by rubbing caustic potash, or potash and quicklime, on a part of the skin till it is destroyed and sloughs, and by keeping open the ulcer thus formed, either with peas, or very stimulant dressings. Setons are another form of issue, made by passing a broad flat needle beneath a portion of the skin, and retaining in the passage thus formed either a skein of silk or a flat band of caoutchouc. The moxa and the actual cautery are also sometimes employed with the same view.

The use of issues for the cure of constitutional diseases, under the idea that they remove noxious principles from the blood, is now entirely abandoned; but they are sometimes had recourse to in order to restore an habitual discharge which has been checked by the cure of any chronic local disease, and the cessation of which has seemed to give rise to congestion of the head or of any internal organ. But the principal value of issues is as counter-irritants, by establishing a disease which is of itself unimportant in the neighbourhood of one which by its situation is more serious; and hence they are amongst the most important means in the cure of chronic inflammations of many internal organs, and especially of those of the joints and of the spine.

ISSUE. (Law.) [PLEADING.]

ISSUS, BATTLE OF. [ALEXANDER III., p. 296.]

ISTHMIAN GAMES. These were one of the four great national festivals of Greece, the others being the Olympian, Pythian, and Nemean. They were celebrated under the presidency of the Corinthians, near Corinth, on the isthmus connecting Peloponnesus with the continent, and were celebrated at intervals of four years, corresponding with the recurrence of the other festivals abovementioned, so that each year had its solemnity. The Isthmian games were first established in honour of Melicertes, the son of Ino (Paus., i. 44); but were reorganized by Theseus in honour of Neptune, the presiding deity of the Isthmus. The crowns bestowed on victors were of pine leaves. As all these games were similar in their object and ceremonies, it will be sufficient to refer to the article on the principal of them, the OLYMPIAN GAMES.

ISTIO'PHORI, a family of Bats. [CHEIROPTERA, vol. vii., p. 22.]

ISTIU'RUS. This genus of Saurians, according to MM. Duméril and Bibron, includes the *Hydrosaurus* (*Hydrosaurus Amboinensis*) of Kaup. [IGUANIDÆ.]

I'STRIA, the antient Histria, a peninsula on the north-east coast of the Adriatic Sea, between the gulf of Trieste and that of Quarnero, or Fiume, is about 50 miles long from north to south, and about 40 miles across in its broadest part, ending in a point near Pola. Till the end of the last century Istria belonged to Venice, except the north-western part of it, or the territory of Trieste, which was in the possession of the House of Austria, but by the peace of Campo-Formio in 1797 the whole of it was given up by the French to Austria, together with the other territories of Venice. Istria now forms a circle of the government of Trieste, in the kingdom of Illyria. [AUSTRIA; ILLYRIA.] Its principal towns are Capo d'Istria, a bishop's see, with about 8000 inhabitants; Pirano, a place of considerable maritime trade, with fisheries, and about 6000 inhabitants; Rovigno, with 9600 inhabitants; and Pola, a decayed town, containing only a few hundred inhabitants, but remarkable for its fine remains of antiquity, such as an amphitheatre, several temples, one of which is dedicated to Augustus, a triumphal arch called Porta Aurea, &c. The antiquities of Pola have been described by Spon and by Cassas, 'Voyage Pittoresque de l'Istrie et Dalmatie,' with fine plates, fol., Paris, 1802. The population of Istria under the Venetian republic was 92,000 in 1789. The inhabitants of the towns and coasts are chiefly Italians, who speak a dialect of the Italian, but the peasantry and people of the interior are mostly of Sclavonian race, and speak a dialect of the Sclavonian language, like the Dalmatians and Croatians. The country produces oil, good wine, fruits, honey, corn, and silk; it is rich in salt and fisheries, and has abundant quarries of freestone and marble. It has some tanneries, and other manufactories, but in general the industry of the inhabitants is in a backward state. An offset of the Julian Alps, running to the eastward of Trieste, extends across to the shores of the gulf of Fiume, and sends out its arms into the body of the peninsula of Istria. On the southern slopes of this range several streams rise, which water the valleys of Istria.

ITALIAN ARCHITECTURE. To what was briefly said on this subject in the article CIVIL ARCHITECTURE, some further account is now added, which may be introduced by observing, that instead of comprising buildings of every style and class to be met with in Italy, the term 'Italian Architecture' is generally restricted to signify that generic style formed by the revival of the Roman orders, and the adaptation of them, and other features derived from works of the same age, to buildings of every kind, domestic as well as public. Without such limitation, the term would apply to buildings having nothing else in common than their locality, to the Ca d'Oro at Venice, no less than to the works of Palladio, and such modernized *Palladianism* as is exhibited in the design of the Teatro Fenice in the same city. Even with such limitation, the style presents so many varieties, both in regard to modes of treatment and taste of design, as to render it difficult to draw up a succinct account of it, if more be attempted than to explain the character of the orders and other leading external features, with their application, and the taste generally manifested in architectural design.

Instead of proposing to themselves the remains of Roman antiquity as models to be freely followed in the same spirit, and modified as circumstances should require, those who endeavoured to fix a new style founded upon the antient orders began by reducing the orders themselves to the strictest mechanical system possible; notwithstanding that for the Doric and Ionic they had no better guide than the few very debased and insipid specimens which occur in Roman works, and the ambiguous explanations given in the text of Vitruvius. Superstitiously taking him as an infallible oracle, they appear to have looked at the examples which Roman structures afforded them chiefly for the purpose of finding out how they might be made to correspond with his precepts and doctrines; whereas the more proper method would have been to have abided by the latter only so far as they were supported by the authority of the best actual examples. Yet if, on the one hand, this bigoted reverence for a writer who is frequently very obscure as well as pedantic, and who is moreover liable to be greatly misunderstood from the absence of visible representations of what he describes, led to the establishment of a most cramped, dry, and formal system in regard to every member of each order and its proportions; on the other, it did not deter from setting aside all classical precedent as respects almost every thing else in a building. Different orders, or repetitions of the same order, being applied to the several stories of buildings whose fronts were pierced with windows, it became unavoidably necessary to abandon all proportion of intercolumniation, and to space the columns according to the breadth of the piers and the apertures between them; which in turn left hardly any alternative than to engage the columns themselves, that is, to attach either half or three-quarter columns to the walls, because insulated columns placed so wide apart from each other would have had an exceedingly poor and meagre effect; and where

one order was placed above another, two straggling rows of low insulated pillars—for low they must be in comparison with the entire height—would have produced an appearance positively disagreeable, and instead of at all ornamenting a building, would have encumbered it with what would have resembled stages of scaffolding. Should any one question this, he has merely to fancy all the columns brought forward two or three feet, in the front of Whitehall chapel, and then judge whether it would be at all improved by two such sprawling galleries standing before it.

For a somewhat similar reason, either pilasters were substituted for engaged columns, or the entablature was made to break over every column,—as in the building just mentioned, which may be referred to as a tolerably characteristic specimen of Italian style in buildings of that class, without those capricious abnormities which so frequently offend us even in the buildings of Palladio himself, although he has the reputation of being comparatively chaste in his designs. For if, instead of being thus broken, the entablature were continued from column to column in each story, overhanging the face of the wall, it would produce the appearance of heaviness as well as weakness.

One defect attending this practice of giving a separate order to each story is, that the columns become insignificant, both in proportion to the entire front and to the windows between them, more especially when the columns are further shortened by being placed on pedestals. In fact windows and doors are generally the predominant features in Italian composition, even where two series are comprised within one order, being generally more prominent in their cornices and pediments than the other projections. They are often decorated with smaller columns or pilasters (as in the front of the Atlas Fire Office, Cheapside, and that of the Legal Assurance Office, Fleet Street), and Palladio has sometimes loaded them by recumbent figures on the raking cornices of their pediments. Sometimes, as in the upper order of the Procuratie Nuove, by Scamozzi, at Venice, the windows (decorated with a lesser order) are carried up to the height of the capitals. In the court of the Louvre the pediments of the windows come immediately beneath the architrave of the order, so that in proportion to the entire mass, and to the windows, the entablatures of the several orders become little more than deep moulded string-courses dividing the stories of the building, and the columns mere expletive decorations attached to the piers. The ornamental details may be in imitation of the members of an antient order, but the character of the antique itself is entirely gone. Even where the windows are kept more subordinate to the order itself, the effect of the latter is frequently diminished by the addition of a heavy attic pierced with windows occupying its entire length, and surmounted in turn by a balustrade, having perhaps a formal row of statues on its pedestals, which viewed at a little distance assume the appearance of so many pinnacles on the summit of the building, while the balusters themselves in such case suggest the idea of perforated battlements, in which, we may remark, they appear to have originated, since there can be little doubt that their name is derived from *Balestra*, the cross-bow, from which arrows were shot through apertures in the parapets of fortified buildings.

Notwithstanding the pedantical strictness with which rules are laid down for the different orders, they so seldom contribute anything either towards character or effect in external design, that the Italian style exhibits itself to most advantage where columns have been discarded, and windows and arches made the chief features in the composition, and the façade crowned by a bold and rich *cornicione*. Of this particular style, in which much may be effected by means of rusticated surfaces, a species of decoration well adapted to it, and admitting very great diversity in itself, we have a small yet exquisite example in the Travellers' Club House, Pall Mall, whose two fronts serve to show what variety of expression may be thus obtained. The front towards the court of the Strand portion of Somerset House is also a good sample of a purified Italian style, where an order is placed on a decorated basement.

Of late years the Italians have abandoned many of their worst architectural faults, corruptions, and caprices, and that taste for exaggerated and frittered ornament which, with here and there an exception, forms so striking a contrast to the antique. But they are still inclined to 'swear by Vitruvius,' and cherish a reverence for Palladio and Vignola. Even Cagnola (who died in 1834), one of their most distinguished architects, seems to have had very little feeling for the beauties of Greek detail as connected with the orders. In fact Greek architecture has hardly been adopted in any one instance, if we except Canova's church at Possagno, which has an octastyle portico of two ranges of columns of the antient Doric order, whose frieze is enriched with reliefs in the metopes. For an account of the modern Palladian architecture of Italy we refer to a paper on the subject in the 63rd number of the 'Quarterly Review,' which contains notices of several buildings not before described.

ITALIAN DRAMA. [ENGLISH DRAMA.]

ITALIC SCHOOL of Philosophy comprises properly two distinct schools, the Pythagorean and the Eleatic. Occasionally however it has been employed in a more restricted sense, and Italic and Pythagorean have been used as equivalent to denote the same philosophical system. The looseness and inconsistency of these different acceptations of the phrase have led to much confusion in the history of philosophy, by giving rise to a personal connection of master and teacher between philosophers who maintained respectively the opinions of Pythagoras and Xenophanes. The peculiar fitness of the designation does not easily appear, and seems to have been owing to an idle endeavour on the part of Greek literary historians to give uniformity to their divisions of the history of philosophy, which were principally drawn from an outward circumstance of a local nature, rather than any internal character of doctrine. Thus we have the Academy, the Stoics, the Megarians, the Eleatics, the Ionians, and so forth.

ITALY, one of the great natural divisions of Europe, extends from its most southern point, Capo dell' Armi, in 37° 55′ N. lat., to 46° 32′ N. lat., its most northern limit, where the Piave, the Adda, and the Ticino have their sources at the foot of the Pennine, Rhætian, and Noric Alps. It lies between 7° and 18° 30′ E. long., the latter being the longitude of the most eastern point of Italy, near Otranto. The northern part of Italy is bounded on the north, north-east, and north-west by the Alps, which sweep round it in a semicircle, beginning from the coast near Nizza, on the Mediterranean, and extending to the Adriatic in the neighbourhood of Trieste.

The ridge of the Apennines, which runs along the Riviera of Genoa, and the northern boundaries of Tuscany, to near Rimini on the Adriatic coast, divides Italy into two distinct regions. One of these regions is situated north of the Apennines, and is chiefly occupied by the basin of the Po and its numerous affluents; while its north-east extremity, which is contracted between the Carnic Alps and the Adriatic, contains the basins of the Brenta, the Piave, and the Tagliamento. The whole region extends in length, from west to east, from Mount Viso in 7° E. long. to the river Isonzo 13° 25′, a distance of 320 miles. [FRIULI.] Its greatest breadth, from the Tuscan Apennines to the sources of the Adda, is about 150 miles. [PO, BASIN OF THE.]

The other region, which is the real peninsula, extends in a south-east direction, between the Adriatic and the Mediterranean seas, for above 500 miles, its breadth varying from 130 to 50 miles, and still less in some parts of Calabria. The Apennines, and the lower ranges which are connected with them, occupy the greater part of the Italian peninsula. The tracts of level country, with the exception of the Roman Campagna and the plains of Foggia and Campania, are of inconsiderable extent, and the peninsula may be viewed as determined in its chief physical features by the long mountain range which traverses it in its whole length. [APENNINES.] The Tuscan Apennines, after running in a direction east-south-east to within a few miles of the Adriatic near Rimini, make a bend to the south-south-east, and run parallel to and near the Adriatic coast, towards which they detach numerous offsets which terminate abruptly on the sea, whilst towards the Mediterranean the slope of the ground is much more gradual, the offsets or secondary ridges running more obliquely to the coast, and forming considerable longitudinal valleys. The larger rivers of the peninsula are on the western side, and the principal basins are those of the Arno, the Tiber, the Garigliano, and the Volturno. [ABRUZZO; ARNO; CAMPAGNA DI ROMA; PAPAL STATES.] In the neighbourhood of Isernia, between the sources of the Volturno and those of the Sangro, the main ridge of the Apennines begins to run more in the centre of the peninsula, leaving to the east the vast plain of Foggia [CAPITANATA], and to the west the plains of Campania.

[Terra di Lavoro.] Farther south, near the sources of the Ofanto, two ridges detach themselves from the main group, one of which runs eastward through the Messapian peninsula, and the other westward through the peninsula of Sorrento to Capo Campanella. The central chain continues to run southward between the basin of the Sele on one side, and those of the Bradano and Basiento on the other. [Basilicata.] It then runs through Calabria, keeping however nearer to the western than to the eastern coast, but occupying with its offsets nearly the whole breadth of that part of the peninsula. [Calabria.]

Northern Italy includes the Sardinian states, Lombardy, Parma, Modena, the Venetian territories, Bologna, Ferrara, and the Romagna. Southern Italy includes Tuscany, the greater part of the Papal States, and the kingdom of Naples. With regard to climate and aspect, the narrow strip called the Riviera of Genoa, which stretches between the Apennines and the sea, may be included in Southern Italy. The islands of Sicily and Sardinia, and several minor ones near the coast, belong to Italy. A general view of the surface and geology of Italy is given in the article Apennines.

The climates of north and south Italy are very different. In the north, frosts and snow are of common occurrence in winter, and delicate plants, such as the orange and the lemon, do not thrive, except in sheltered situations; but in the south, especially near the sea-coast, tender plants thrive in the open air, and in the southernmost part of the peninsula, as well as in Sicily, even tropical plants, such as the sugar-cane, the cotton-plant, the Indian fig, and the date-palm come to maturity. The vine grows all over Italy, but the best wines are made in the south. The high Apennine regions however are bleak and cold even in the south, and as they are hardly anywhere much farther than a day's journey from the coast, there is great variety of climate in the peninsula. The staple products of Italy are corn, rice, wine, oil, silk, and fruits of every kind, and the mountains afford summer pasture for the cattle. The system of irrigation prevails in the north, especially in Piedmont and Lombardy, but the southern parts are subject to droughts in summer. The rivers which have their sources in the Alps or in the higher Apennines are perennial, whilst the other streams are mostly dry in summer. The atmosphere is remarkably clear, especially all along the coast of the Mediterranean, and the tints of the mountains and of the clouds are beautifully warm. Italy is emphatically the land of painting, of melody, and of poetry. The scenery of the Bay of Naples, of the Straits of Messina, and of the Riviera of Genoa, is unrivalled in the world.

History.—The name 'Italia' appears to have been limited in remote times to the most southern part of the peninsula as determined by a line drawn from Tarentum to Posidonia (Herodotus, i. 24; Dionysius, i. 73); and indeed its boundaries were once even more contracted. In the age of Timæus (about 264 B.C.) it stretched as far north as the Tiber, and beyond Picenum. Until the time of Augustus, Italia Proper was understood to extend only as far as the Rubicon on one side and the Macra on the other; the rest was called Cisalpine Gaul, the country of the Veneti, and Liguria.

The history of antient Italy, as a whole, is a part of the history of Rome, and the history of the several antient divisions, such as Etruria and others, requires a separate consideration. The history of those nations which preserved their independence for several centuries after the foundation of Rome, has been treated by several authors, and particularly by Micali, *Storia degli Antichi Popoli Italiani*, and sketches of it are given in this work in the articles Apulia, Campania, Etruria, &c. The reader may also refer to the 1st volume of Niebuhr's 'Roman History.' The period that elapsed after the fall of the Western Empire is noticed in the articles Belisarius, Longobards, and Theodoric.

The modern history of Italy begins properly with the reign of Charlemagne, who was crowned king of the Romans and emperor of the West in the year 800. Under the weak rule of his successors, the counts, marquises, and other great feudatories of the new Western Empire became, *de facto*, independent, and Italy was parcelled out into numerous principalities or states. As the principal towns rose in population and wealth they made themselves independent of the feudatories, and formed so many commonwealths. Then came innumerable quarrels between the towns and the great lords; of the towns among themselves; of the lords with one another; and last of all, of part of both towns and lords against the kings of Germany, who styled themselves the successors of Charlemagne, and assumed the often merely nominal title of kings of Italy and emperors of the West. (Guelphs and Guibelines.) In the midst of all this confusion some considerable states were formed, such as the Papal State, the kingdom of Sicily and Apulia under the Normans, the republics of Venice, Florence, and Genoa, and lastly the duchy of Milan. The dukes of Savoy, originally a transalpine dynasty, also acquired large possessions on the south side of the Alps. Here we have the origin of the present Italian states. A general history of modern Italy is a most intricate and unmanageable subject; sketches of the history of the various states are given in the articles Amadeus, Florence, Genoa, Sicily, Venice, &c.

At the beginning of the sixteenth century Charles V. established by conquest the dominion of the House of Austria over the duchy of Milan and over the kingdoms of Naples and Sicily, which dominion, on his abdication, he gave up to his son Philip II. and his successors of the Spanish branch of the House of Austria. Spain continued to rule these fine territories till the beginning of the eighteenth century, when, by the extinction of the Spanish branch of the House of Austria, Lombardy was transferred to the German branch of the same House, and Naples, and Sicily were formed into an independent kingdom under a Spanish infante. The duke of Savoy at the same time assumed the title of king of Sardinia. The work of amalgamation, consolidation, and national independence in Italy made great progress during the eighteenth century. Venice, Tuscany, Genoa, the Sardinian monarchy, Naples and Sicily, figured among the sovereign states of Europe, while the only part possessed by a foreign power was Lombardy. The French revolution and subsequent invasion of Italy deranged this order of things. Under the pretence of establishing republics the French exercised a military sway over Italy, whilst Venice disappeared from the list of sovereign states and became an Austrian province. Napoleon, having become emperor, formed a kingdom of Italy which however did not include one third of Italy: he annexed another third to the French empire, and gave Naples to his brother-in-law Murat. In 1814 the French evacuated Italy, and the former states were restored, with the exception of Venice, which remained under Austria. Genoa was annexed to the Sardinian monarchy, which kingdom and that of the Two Sicilies are now the two principal Italian powers: the Pope and Tuscany are the two next in importance. Several little territories and jurisdictions on the coast and the island of Elba were annexed to Tuscany, and it was also stipulated that on the demise of Maria Louisa, duchess of Parma, the duke of Lucca should succeed to her states, and Lucca should be annexed to Tuscany. Upon the whole therefore the work of amalgamation and consolidation has made further progress in the present century. The best general historians of modern Italy are Guicciardini, 'Storia d'Italia,' with the continuation by Botta till 1814; Muratori, 'Annali d'Italia,' continued by Coppi till 1820, and Bosti, 'Storia d'Italia Antica e Moderna.' Histories of particular states, towns, and periods are innumerable; the history of Florence has been written by Malispini, Dino Compagni, Villani, Poggio, Bruni, Machiavelli, Varchi, Segni, &c. Pignotti and Galluzzi have written a general history of Tuscany; that of Naples by Giannone, has been continued by Colletta to the present time: Giulini, Rosmini, and Verri have written the history of Milan; a series of writers have treated of the history of Venice, 'Istorici delle cose Veneziane,' and the historians of Genoa are equally numerous. There is hardly a town in Italy which cannot boast its native chronicler. Among the foreign historians of Italy, Sismondi deserves especial mention for the 'Histoire des Républiques Italiennes,' a work of vast research, of conscientious accuracy as to facts, and of attractive eloquence, but with a decided bias in its judgments and inferences in favour of those very unequally administered and very factious and turbulent municipal communities.

Political Divisions.—The area of Italy, with Sicily, Sardinia, and the adjacent small islands, is estimated at about 123,000 English square miles, and the population is estimated at 21 millions.

The following view is from Count Serristori's 'Saggio Statistico dell' Italia' (Vienna, 1833): the areas are taken from Neigebaur's 'Gemälde Italiens' (Vienna, 1832), but

they are to be considered only as approximations, as there is considerable discrepancy between the various authorities.

The LOMBARDO-VENETO kingdom, of which the emperor of Austria is king, consists of two great divisions: Provincie Lombarde, or government of Milan, with an area of 8460 square miles, and 2,379,000 inhabitants; and Provincie Venete, or government of Venice, with 9472 square miles, and 1,900,000 inhabitants. 2. The SARDINIAN monarchy consists of two great divisions: the Stati di Terra Ferma, or continental territories, with an area of 20,850 square miles, and 3,750,000 inhabitants, and the island of Sardinia, with an area of 8200 square miles, and 510,000 inhabitants. 3. The Grand Duchy of TUSCANY, with an area of 8700 square miles, and 1,300,000 inhabitants. 4. Duchy of LUCCA, with an area of 420 square miles, and 152,800 inhabitants. 5. Duchy of PARMA, with an area of 2300 square miles, and 454,000 inhabitants. 6. Duchy of MODENA and MASSA, with an area of 2068 square miles, and 350,000 inhabitants. 7. Republic of SAN MARINO, with an area of 27 square miles, and 7000 inhabitants. 8. PAPAL STATES, with an area of 17,860 square miles, and 2,707,000 inhabitants. 9. The kingdom of the Two SICILIES, consisting of two great divisions: Dominj di quà dal Faro, or kingdom of NAPLES, with an area of 31,610 square miles, and 5,809,000 inhabitants; and Dominj di lá dal Faro, or SICILY, with an area of 12,900 square miles, and 1,681,000 inhabitants.

The most densely inhabited state is that of Lucca, which contains 362 individuals for every square mile, and one proprietor for every four inhabitants. Next to it in population come the Lombard provinces. The most thinly inhabited parts are the Campagna of Rome and the island of Sardinia. There is no country of Europe which has so many considerable towns in proportion to its extent as Italy. Besides one city, Naples, which has above 350,000 inhabitants, there are six others, namely, Milan, Venice, Turin, Florence, Rome, and Palermo, which exceed 100,000 each; five more, namely, Genoa, Leghorn, Verona, Bologna, and Messina, have from 60,000 to 80,000; six contain between 30,000 and 40,000, namely Padua, Vicenza, Parma, Bergamo, Brescia, and Catania; seventeen contain from 20,000 to 30,000, namely, Alessandria, Asti, Cremona, Pavia, Mantua, Piacenza, Modena, Lucca, Pisa, Siena, Ancona, Perugia, Ferrara, Ravenna, Foggia, Trapani, and Cagliari; and a still greater number have a population varying from 10,000 to 20,000. The population is everywhere on the increase, at the average rate of one per cent. annually.

Of the actual social condition, manners, and temper of the Italians, we have had numerous accounts from travellers since the peace. All those which affect to give a general sketch of Italian character, even the best of them, are imperfect, and partly inaccurate; and this they necessarily must be. It is almost impossible for a foreigner to have all the requisites for such a work—the time, the preparatory information, the facilities, the introduction to the various classes of society, which would be requisite to secure a satisfactory performance of the task. Italy is not one country, inhabited by one people long fashioned and amalgamated under one central government, and receiving its form and pressure from the influence of one capital. There are not only many provincial differences, as in France and other compact states, but national differences of character, different institutions and customs, and even different languages. The steady plodding inhabitants of the broad, level, and rich plain of the Po are a very different sort of people from the active, frugal, money-seeking, adventurous, and free-spirited Genoese, or the caustic, refined, but somewhat consequential and verbose Tuscans; while the Tuscan himself is different from the mercurial, fantastical, careless and pleasure-seeking, but quick and acute Neapolitan. Again, Italian domestic society is not of easy access to foreigners; the Italians are more reserved than the French, and there is also a remarkable difference between the manners of the various classes, and between the inhabitants of the towns and the country people. It may be affirmed however of the Italians that they are possessed of great capabilities, fit for all intellectual pursuits, and for art in general; that they have a quick discernment, considerable elasticity of temper and flexibility of disposition; a natural taste for music and poetry; that they are more fond of pleasure than of assiduous labour, more inventive than persevering, naturally of warm and kind feelings, but prone to suspicion and jealousy. Morals in Italy have greatly improved within the last half century, owing chiefly to a greater diffusion of instruction, better laws, and a better system of police. Heinous crimes are become much more rare, but considerable looseness of conduct still exists in the towns; much time is lost in idle gallantry, and the conjugal bond is not sufficiently respected, especially among the middling and higher classes, though this remark admits of course of innumerable exceptions. The charge however is applicable to other southern countries besides Italy. Industry has made and is making considerable progress; better modes of agriculture have been adopted, manufactories are established everywhere, new roads and canals have been made, particularly in Lombardy, the Sardinian states, and Tuscany; and several railways are in course of being laid. The chief towns are all embellished and increasing in population. The maritime trade, especially of Genoa, Leghorn, Venice, and Naples, is thriving, though inferior to that of Trieste. And here we may observe that the trade with Italy is of greater importance to England than is commonly imagined: it appears by the official returns, that the value of British produce and manufactures exported to Italy amounts nearly to three millions sterling annually, exclusive of colonial produce, which is more than is exported to any other European country, with the exception of Germany. The annual imports from Italy into the United Kingdom are about one million and a half sterling.

Among the writers who have given the best accounts of particular parts of Italy in the present century, we may mention Rose, 'Letters from the North of Italy,' which treat of the Venetian territories; Châteauvieux's 'Lettres écrites d'Italie,' chiefly on the state of agriculture; Keppel Craven, 'Tours in Calabria and the Abruzzi;' Tournon, in his elaborate work 'Etudes statistiques sur Rome et la Partie Meridionale des Etats Romains,' which gives a faithful account of that important portion of Italy; and a very impartial article on 'Education in Tuscany in 1830,' in No. III. of the 'Quarterly Journal of Education.' Some information concerning Italian society and manners may also be derived from Millin, 'Voyages en Piémont;' Vieusseux, 'Italy and the Italians in the Nineteenth Century;' Simond, 'Voyage en Italie,' though hurriedly written and deficient in discrimination; Valery, 'Voyages littéraires en Italie;' Della Marmora and Captain Smyth 'On the Island of Sardinia;' Captain Smyth 'On the Island of Sicily;' and Benson's 'Corsica,' which last is essentially an Italian island, although belonging to France. Two critical sketches 'On modern Books of Travels in Italy' appeared in Nos. IV. and VIII. of the 'Quarterly Journal of Education;' and another on Valery's book in No. 33 of the 'Foreign Quarterly Review,' January, 1836. Accounts of the state of education in all its branches in the various Italian states are given in Nos. I., V., VI., and XVI. of the 'Quarterly Journal of Education.' Elementary or popular education is best attended to in Lombardy and Tuscany; but it is making progress also in the other states. The judicial system has also received considerable improvement. In Tuscany, Naples, and Genoa examinations of witnesses and trials are now public; while in other states the system of written depositions and trials with closed doors still prevails. Torture has been long since universally abolished. The Inquisition exists only in the Papal States.

Italian Language and Literature.—The language called Italian is the written language of Italy, and bears the same analogy to the spoken language of Tuscany and Rome as the written languages of France and England bear to the oral language spoken in the towns and provinces of those respective kingdoms in which dialects do not prevail. But while in France and England the use of dialects is confined in great measure to the peasantry of districts remote from the capitals or to mountainous parts, most of the Italian states have each a living dialect, which is the oral language of the people, and spoken even by educated people among themselves, although all educated people speak also the Italian or common written language, which they learn as a branch of education. The dialects of Italy are numerous, and most of them contain written and printed works, especially plays and other poems. The principal dialects are the following:—1. The Milanese is spoken at Milan and its territory, with some variations according to the different districts. It has been cultivated by several writers of real poetical genius, such as Maggi, Parini, and in our times

by Grossi and Porta. A selection of Milanese poems has been made, 'Collezione delle migliori Opere scritte in Dialetto Milanese,' 12 vols. 12mo. 2. The Venetian is one of the most graceful of the Italian dialects, and under the late republic was the language of the senate and of the courts of justice. There are numerous writers in this dialect; among others, Gritti, Lamberti, Goldoni, and, in our time, Buratti. A selection has been likewise made of these, 'Collezione delle migliori Opere scritte in Dialetto Veneziano,' 14 vols. 12mo. 3. The Mantuan dialect has been illustrated by the writings of the eccentric wayward monk Folengo. 4. Calvo has written in the Piedmontese, and Alfieri has given a short vocabulary of it, with the corresponding words in Tuscan. The Piedmontese has considerable affinity with the Languedocian and other Romance dialects. 5. Genoese: Foglietta and Cavalli are two of the best writers in this dialect. 6. The Bolognese is one of the most uncouth dialects of Italy, but it has some poets, among others Giulio Cesare Croce. These are the principal dialects of North Italy, besides which there are many other local ones, such as Bresciano, Bergamasco, that of Padua, which resembles the Venetian, and that of the Friuli. In South Italy the principal dialects are the following:—7. The Neapolitan, or Apulian, was the language spoken at the court of Frederic II. in the thirteenth century, and in which the history of that prince by the contemporary chronicler Matteo Spinello is written. It was afterwards spoken at the court of the Anjou and Aragonese kings of Naples, and has been in fact used within our own times by King Ferdinand and his courtiers. It is very copious, abounds with diminutives and vituperative terms, and is well suited for broad humour and for the purpose of imitative harmony. The Neapolitan among all other Italian dialects has been perhaps the most cultivated by writers. There is a collection of Neapolitan poems in 28 volumes, several of which, such as those by Cortese, Sgruttendio, Capasso, both in the humorous and the pathetic styles, have considerable poetical merit. The other South Italian dialect is, 8, the Sicilian, which can boast of Giovanni Meli, dead not many years since, who ranks among the first lyric poets of Italy, and whose works have been collected and published in seven volumes. Between the Neapolitan and Sicilian is the Calabrian dialect, which participates more of the latter, and in which there is a spirited version of Tasso's 'Gerusalemme.' Lastly, 9, the dialect of the Island of Sardinia has a great resemblance to the Catalonian and Valencian and other dialects of the Romance or Provençal language. The Sardinian is also a written dialect. There is an article 'On the Study of the Italian Language and Literature' in Nos. X. and XII. of the 'Journal of Education,' and another 'On the Dialects and Literature of Southern Italy' in No. IX. of the 'Foreign Quarterly Review' for November, 1829.

The Italian dialects must not be considered as corruptions of the written Italian, but as languages which have an affinity to and are anterior to it, and derived from the corrupt dialects of the familiar Latin or Roman which were spoken in the provinces of Italy remote from Rome, and perhaps also in part from the older languages of Italy existing previous to the Roman conquest. The influx of the northern nations effected a total corruption of the spoken Latin: articles and auxiliaries were introduced; terminations were altered or neglected; some, though not a great many, words of Teutonic origin were introduced; and various dialects resulted from these various combinations which were called by the general name of Romanc, Romanic, or Romance language, like those spoken in the south of France. The dialects spoken in Central Italy retained a greater affinity to one another, as well as to their common Latin parent. If we look at the old chronicles and other documents of the thirteenth century, written in a familiar style, whether at Naples, Rome, Bologna, or Tuscany, we see a great similarity in their syntax and etymology. The oral dialect of Tuscany seems to have attained a considerable degree of polish and grammatical regularity sooner than the others; probably it had never been so corrupt as the rest, owing to the local position of Tuscany, which was not extensively or permanently colonized by the northern tribes, and also owing to the early independence of the Tuscan cities, and their prosperity and civilization. In the rest of Italy a few men of education used also an oral language more refined than the generality of the people, which was called Lingua Aulica, or Cortigiana, and thus the early versifiers, including princes and courtiers, Frederic II. and his chancellor Pietro delle Vigne at Naples, Guido Guinicelli and Frà Guidotto at Bologna, Guido delle Colonne, a Sicilian, Can della Scala at Verona, Guido da Polenta, prince of Ravenna, wrote in a language which differs little from that of Brunetto Latini, Guitton d'Arezzo, Guido Cavalcanti, and other Tuscan poets of the same age. But Tuscany had this advantage over the rest, that its familiar spoken language was more generally polished, so as to resemble the poetical and select language of the other Italians, and the Tuscan poets had the benefit of writing in a living dialect, 'lingua volgare,' and their poems were understood by the generality of their countrymen. The writers of the fourteenth century, Dante, Dino Compagni, Petrarch, Boccaccio, Cino da Pistoja, Sacchetti, Villani, Pandolfini, were all Tuscans, and they permanently impressed on the written language of Italy the stamp of Tuscan spirit and idiom. As people of education in every part of Italy applied themselves to write in the 'lingua volgare,' the use of writing in Latin being gradually dropped, this 'lingua volgare,' or written Italian, began to form an essential part of education, and all those who received school instruction learned to speak it more or less correctly. It came afterwards to be adopted in many places as the language of the government, of the courts of justice, of the pulpit, and of the stage, and thus it has been styled emphatically the Italian language, because it is used as the general medium of communication, written and oral, all over the peninsula. But it is nowhere, except in Tuscany and in part of the Roman states, the language of the lower orders, the language of the nursery, of the markets, of convivial familiarity, of every-day life. Its general adoption is however strongly urged of late years by the various governments, and particularly attended to in all elementary schools.

The writers of the fourteenth century are called by the Tuscans the 'Trecentisti,' and they are considered by many as the purest models of Italian composition. In the fifteenth century there was a retrograde movement in the cultivation of the Italian language. The Latin again resumed the ascendency as a written language, and the 'lingua volgare' was left to the vulgar, or employed merely for familiar purposes. The discovery of the antient classics, the revival of the study of the Roman law, the arrival of many learned Greek refugees flying from the Ottoman conqueror, the influence of the Roman hierarchy, whose language was the Latin—all these circumstances gave a general impulse towards classical learning, and the Italian literati disdained to write except in the language of their presumed forefathers. Alberti, Bracciolini, Bruni, Filelfo, Panormita, Platina, Pontano, Valla, Ficino, and other learned men and also women of that age, wrote in Latin. But Lorenzo de' Medici at Florence, the Este at Ferrara, the Gonzaga at Mantua, countenanced Italian poetry, and Pulci, Bello, and Bojardo gave the first specimens of the Italian epic, while Poliziano and Lorenzo himself excelled in lyrics. In this same century Cennino Cennini wrote an Italian treatise upon painting, and the illustrious Leonardo da Vinci, painter, architect, and engineer, composed his precepts on the same art, which were published long after his death; 'Trattato della Pittura,' 1651.

The sixteenth century was the second æra of Italian literature. It has been styled the age of Leo X., because that pontiff, in the early part of the century, surrounded himself with some of the most learned men of his time. But the two great historians and statesmen Machiavelli and Guicciardini, the 'Divino Ariosto,' and Michelangelo Buonarroti, who was sculptor, painter, architect, and poet, are four names sufficient of themselves to adorn any age or country. The other principal writers of the sixteenth century were: the historians and biographers, Varchi, Segni, Bembo, Paruta, Davanzati, Costanzo, Vassari, Cellini; the poets, Sannazaro, Berni, Molza, Trissino, Guarini, and above all Tasso; the essayists, Castiglione, Della Casa, Speroni, and Bottero; the critics, Castelvetro and Salviati; the novelists, Bandello, Firenzuola, Grazzini; the architects, Barocci da Vignola, Palladio, and Marchi, and numerous others in almost every branch of learning. The learned Sigonio, Baronius, Panvinio, Vida, the jurists Alciati and Turamini, the mathematicians Maurolico and Cardano, and many other men of science, wrote in Latin. The authors of the sixteenth century are called by the Italians 'Cinquecentisti,' and are considered as models of Italian writing, though some critics observe in most of them a falling off from the

freshness and raciness of the great Florentine writers of the fourteenth century.

The seventeenth century, called by the Italians the age of the Scientisti, exhibited a degeneracy of taste, both in literature and the arts. The leaden yoke of Spanish viceroys, armed with all the terrors of delegated absolutism and of clerical inquisition, ignorant or careless of the very elements of government and administration, weighed heavily over the finest regions of Italy. The miseries resulting from that system have been described by Boccalini and Giannone, and again vividly retraced in our own time, by Manzoni in his 'Promessi Sposi,' and by Cantù in his 'Ragionamenti sulla Storia Lombarda del Secolo XVI.' The Italian writers, and especially the poets, adopted a turgid hyperbolical style, replete with false conceptions, and all the tinsel of rhetorical adulation. The school of Marini and of his worse disciples has become proverbial as the school of depraved taste in composition. However the same causes of mental degradation and corruption did not operate equally over all the peninsula. Tuscany, Venice, Genoa, Piedmont, retained their independence and with it their national spirit. Accordingly we meet here and there with writers distinguished by their sentiments as well as by their language, such as the celebrated Sarpi, the learned prelates Bentivoglio, Pallavicino, and Bellarmino; the historian Davila; the Jesuits Segneri and Bartoli; the poets, Guidi, Chiabrera, Filicaja, Tassoni, Rinuccini, Menzini; the painter and poet Salvator Rosa; the philologist Salvini; while Italian science can boast in the same age of Galileo, Cassini, Torricelli, Malpighi, Borelli, Marsigli, Redi, Viviani, and Guglielmini. Antonio Serra, one of the earliest, if not the earliest, writer on political economy, published in 1613 a treatise showing the various causes through which countries may become enriched; a work neglected and forgotten for ages after. The historian Noris, the learned antiquarian Bianchini, and the jurist Gravina, wrote in Latin.

In the eighteenth century Italian literature assumed a new character. The historians Maffei, Muratori, and Giannone, and the philosophic writers Vico, Stellini, and Genovesi, brought a new light into their respective departments. The spirit of investigation and deep reflexion was now busy at work. Goldoni effected a revolution in the Italian stage, and Metastasio imparted a new vigour and poetical freshness to the melodrama or opera. In the department of criticism there were Zeno, Baretti, Gozzi, Mazzuchelli, and Cesarotti; Milizia, Lanzi, and Bottari wrote eloquently on the fine arts; Martini and Tartini, on music; Verri, Carli, Galiani, Neri, on political economy; Bettinelli, Tiraboschi, and Corniani, on the history of Italian literature; Buonafede, on the history of philosophy: Beccaria, Filangieri, and Mario Pagano, on legislation; Vallisnieri and Spallanzani, on natural history; Volta and Galvani, on physics; Denina, on the history of Italy; Passeroni, Varano, and Parini wrote moral poetry; and lastly Alfieri created the Italian tragedy.

The invasion of Italy by the French in 1796 and the political revolution which followed, whilst they served to stimulate the minds of the Italians to exertion, had an unfavourable influence upon the language. French was the language of the conquerors, and it became the fashionable language of the conquered. Those Italians, and they formed an immense majority, who did not know French, intermixed French idioms with their already imperfect and dialectic Italian, and a spurious unseemly compound was thus formed which was neither French nor Italian, and which found its way into the political essays, the newspapers, the pleadings, and even the acts of government. A few writers, formed in a better school, opposed the torrent; among these are Alfieri, Monti, Foscolo, Ippolito Pindemonte, Napione, Cesari, and Giordani. The other principal writers of the present century are—the historian Botta, the best that Italy has produced since the sixteenth century; the tragedians Niccolini and Pellico; the romantic poets Grossi and Sestini; the didactic Arici; the satirist D'Elci; and above all, the novelist, philosopher, dramatist, and lyric poet Manzoni, who has given Italy the first model of an historical novel, an example followed by Professor Rosini in his 'Monaca di Monza,' and by several others. Nota has supplied the Italian stage with many good comedies. Micali has written the history of Italy before the Roman dominion; Bossi, a general history of Italy; Vacani, the military history of the Italian army employed in Spain under Napoleon; Cuoco and Colletta, the history of Naples; Pignotti, the history of Tuscany; Manno, that of the island of Sardinia; and Serra, the history of Genoa. Cicognara has given a history of sculpture; and Missirini, an interesting biography of the great sculptor Canova. Ugoni and Lucchesini have written on the Italian literature of the eighteenth century. Gioja has written largely on political economy and legislation; Romagnosi and Tamburini, on jurisprudence; Brocchi and Breislak, on geology and mineralogy.

These, who are only a few out of many, are the principal writers that Italy has yet produced in the present century. The best historians of Italian literature are Tiraboschi, continued by Lombardi to the end of the eighteenth century; Corniani, continued by Ugoni; Ginguené, continued by Salfi; and Fontanini's 'Biblioteca dell' Eloquenza Italiana,' with the notes by Zeno. Numerous writers have treated of particular branches, such as Aldeano, Quadrio, Crescimbeni; and series of Italian historians, dramatists, lyric poets, satirists, &c., have been published.

Italy, which has been for ages the nurse of the fine arts, has still, since the death of Canova, many respectable artists, but hardly a first-rate sculptor or painter. With architects and engineers she is better provided. The art of engraving is in a highly flourishing state; Morghen, Longhi, Gandolfi, Anderloni, and others, are first-rate artists, and the splendid works illustrative of the arts which appear in Italy, such as 'The Churches of Italy,' the 'Famiglie Celebri Italiane,' edited by Litta, and others, are equal to anything of the sort produced by any other country. (*Quadro della Letteratura, Scienze, ed Arti in Italia nell' anno* 1820, di Giuseppe Acerbi; *Saggio sulla Storia della Letteratura Italiana, nei primi* 25 *Anni del Secolo XIX*., 8vo., Milano, 1831; Sacchi, *Indole della Letteratura Italiana nel Secolo XIX.*)

The journals, both literary and political, of which forty years ago there hardly existed a dozen in all Italy, have increased to nearly two hundred since the last peace, embracing every branch of literature, science, and art. The statistics of every state of Italy are also published, as well as accounts of the state of education, legislation, industry, commerce, and other useful knowledge. Such is the condition of Italy at the time we are writing (1838), very different in reality from what it was at the end of the last century, or from what party exaggeration and querulousness would represent it still to be. An immense progress has been made, though many further improvements may still be wanted. In machinery, mercantile speculation, and practical political economy, Italy is certainly behind Germany and England, and perhaps France.

The religion of Italy is the Roman Catholic, with the exception of a few valleys among the Alps of Piedmont, inhabited by the Valdenses, and of the Jews, who live in most of the principal towns, and have synagogues. At Leghorn, Florence, Venice, and other mercantile places, chapels for foreign Protestants and Greeks are tolerated.

ITCH, or, as it is termed by nosologists, Scabies or Psora, is a disease of the skin, of which the most prominent symptom is a constant and intolerable itching. The eruption consists most commonly of minute vesicles filled with a clear watery fluid, and slightly elevated on small pimples; but its character is often obscured by a mixture of papulæ and pustules with the vesicles. Hence the disease has been divided into distinct species according to the predominance of each kind of eruption; but the distinction is artificial, and of no practical utility. The eruption occurs principally on the hands and wrists, and in those parts most exposed to friction, as the spaces between the fingers and the flexures of the joints. After a time it extends from these parts to the arms, legs, and trunk; but very rarely, if ever, appears on the face.

The itch is attended by no constitutional disorder, except in those severest forms in which the eruption consists chiefly of large pustules surrounded by considerable inflammation of the adjacent skin. It never appears to arise spontaneously; but, where cleanliness is not strictly observed, it is easily communicated by contact. Minute insects, of a species of Acarus, are often found in the vesicles; but as they are also often absent, the disease cannot be considered to depend entirely upon their presence.

A certain specific for the cure of the itch, which never gets well without treatment, is the local application of sulphur; all the parts on which the eruption is visible should be plentifully smeared with the *unguentum sulphuris* every

night, or every night and morning, till the cure is perfected, which will require from three days to a fortnight, according to the severity and extent of the disease. The ointment must remain on the parts after each application, and occasional warm baths ought to be used during the treatment.

I'THACA, called Thiaki by the modern Greeks, celebrated in antient poetry as the country of Ulysses, and now one of the seven Ionian Islands, is situated north-east of Cephalonia, from which it is divided by a channel between three and four miles wide. It is twelve miles long, and about four miles in its greatest breadth On the east coast of the island, facing the mainland of Acarnania, from which it is about twenty miles distant, is the deep Bay of Bathi, with a good harbour, and the little town of Bathi, with 3000 inhabitants. The country around is planted with vines, olive and orange trees. The remainder of the island is hilly and rocky, especially towards the western coast, with small but deep valleys between the hills, which have a good soil, and produce currants, wine, corn, oil, and all kinds of fruits. The red wine of Ithaca is one of the best in Greece. There is abundance of springs on the island, but wood is scarce. The whole population is 9566, and is scattered among eight or nine villages The habits and manners of the natives are like those of their neighbours of Cephalonia They belong to the Greek church, and the clergy are under the direction of a protopapa The cultivation of the soil, fishing, and some coasting trade, form the occupation of the people They export currants, oil, and wine The climate of Ithaca is healthy and mild. (Neigebaur, *Gemälde Italiens und der Ionischen Inseln*) [IONIAN ISLANDS]

ITHO'ME [MESSENIA]

ITTNERITE This mineral occurs crystallized in rhombic dodecahedrons and massive Structure compact Fracture imperfect conchoidal, passing into uneven. Hardness 5.0 to 6.0 Colour bluish or ash-grey. Lustre resinous to vitreous Specific gravity 2.3. It forms a jelly when put into acids Fuses *per se* before the blowpipe, with effervescence of sulphurous acid, into an opaque blebby glass. It yield d by analysis—

Soda	11·29
Potash	1 57
Silica	30·17
Alumina	28 40
Lime	5·24
Oxide of iron	0 62
Sulphate of lime	4 89
Common salt	1 62
Sulpuretted hydrogen and water	10 76
	94 56

ITURBIDE. [MEXICO]

IVAN [RUSSIA]

IVES, ST [CORNWALL, HUNTINGDONSHIRE.]

IVIÇA, or IBIZA, the Ebusus of the antient geographers, one of the Balearic Islands, lies forty-two miles south-west of Majorca, and is about twenty-seven miles long from north east to south-west, and about fifteen in its greatest breadth It is divided by a channel three miles wide from the island of Formentera, which lies due south of it. The south-west point of Iviça is fifty miles east by north of the Cabo Nao on the coast of Valencia on the mainland of Spain. The island is hilly and stony in many parts, but in others very fertile. It produces oil and wine, corn, fruits of every kind, has a large stock of sheep, and the sea near the coast abounds with fish. The manufacture of salt in salt-pans constitutes a great branch of industry. The mountains are covered with timber-trees The inhabitants are indolent and uninformed their mode of agriculture is slovenly They speak a dialect of the Limosin, the language of Valencia and Catalonia, which is a branch of the Romance language once spoken all over the south of Europe The island is divided into five cuartones or districts, namely,—Llano de Villa, Santa Eulalia, Balanzat, Pormañy, and De Salinas The capital, Iviça, built on a peninsula on the south-west coast of the island, is fortified, has a good harbour, and reckons about 6600 inhabitants: it has a cathedral and six other churches, two hospitals, and a public school or gymnasium (Miñano, *Diccionario Geográfico de España*)

IVORY, the name given to the substance which composes the tusks of elephants, is extensively used in the arts for making or embellishing numberless small articles in almost universal use, and which do not require to be further described. The principal supplies of elephants' teeth to this country are derived from the west coast of Africa and from Ceylon. Out of 5846 cwt. imported in 1837, we received 2246 cwt. from the former quarter, and 2297 cwt. from Ceylon. The remaining imports are from the coast of Barbary, the Cape of Good Hope, Madagascar, and Siam. The United States of America also send to this country some of the ivory which they import The total quantities imported and used respectively in each of the last ten years have been—

	Imported	Taken for Consumption
1828	5596 cwt	3531
1829	4345	3605
1830	5489	3628
1831	5267	3368
1832	2992	2533
1833	5042	3958
1834	6732	4282
1835	5204	3698
1836	6524	4584
1837	5846	3725

IVORY BLACK, or, as it is commonly called, *animal charcoal* and *bone black*, is prepared usually, as the latter appellation indicates, from bones heated in iron cylinders to dissipate the more volatile products of the animal matter which they contain, and to leave the phosphate of lime intermixed with much charcoal and some of the saline portions of the bone. Carbonate of ammonia is one of the products obtained.

Animal charcoal does not greatly differ in appearance from common charcoal, but there are points in which they greatly differ, thus animal charcoal obstinately retains some azote, while wood charcoal often contains hydrogen

Ivory, or bone black, possesses the singular property of completely destroying the colour of a great number of animal and vegetable solutions to much greater extent than common charcoal; thus an ounce of animal charcoal will in a few minutes entirely remove the colouring matter of a pint of red wine. This effect is more readily produced on hot than on cold fluids It is largely employed on account of its decolouring power in sugar refining, and the finer the powder to which it is reduced the greater is its efficacy.

It is difficult to give a satisfactory explanation of the decolorizing power of animal charcoal, but it appears that it is entirely dependent upon the carbonaceous matter, the action of which is however modified by the presence of the earthy salts, as the carbonate and phosphate of lime It further appears that the charcoal combines with the colouring matter, but only when it is in a state of fine powder

IVORY COAST [COAST, GOLD]

IVRE'A, a province of the Continental Sardinian States, stretches from the foot of the Alps, which divide it from Savoy and the Val d'Aosta, southward to the Po, and is watered in its length, which is about 20 miles, by the Dora Baltea The Orca, another affluent of the Po, having its source on Mount Iseran, one of the high Graian Alps, waters the western parts of the province of Ivrea, where it borders upon that of Turin. To the east, Ivrea is bounded by the province of Vercelli, and to the north, by that of Aosta The country consists in great part of hills, being the lowest offsets of the Alpine chain, and some fine valleys between, the southern part of it merges into the great plain of the Po The soil produces abundantly corn, good wine, hemp, and pastures on which a great number of cattle are fed. The system of irrigation by water drawn from the Dora and other streams is here in full operation Silk is also made, and the mountains produce plenty of chestnuts. This province was a marquisate in the middle ages, when Berengarius, marquis of Ivrea, became king of Italy It is called 'Il Canavese,' from the quantity of hemp ('canapa') which it produces, and the inhabitants are noticed in the 'History of Piedmont as quarrelsome and warlike. The population of the province is 118,000. The chief town is Ivrea, in a fine situation on the slope of a hill on the left bank of the Dora, across which is a Roman bridge of a single arch: it is at the entrance of the lowland of Italy for travellers coming by the St Bernard Pass. Ivrea is an old-looking town, with walls and a castle, it is a bishop's see, has six churches, besides the cathedral and several convents, a seminary for clerical students, a royal college, an hospital, and about 8000 inhabitants. There are some re-

mains of antiquity at Ivrea; among others, a fine urn with figures in relief. The cathedral is built on the ruins of a temple of the Sun. Ivrea, called antiently Eporedia, was a town of the Salassi, and afterwards was colonized by the Romans.

The other towns of the province are: Castellamonte, with 4800 inhabitants; Caluso, 5400 inh., and a college; Cuergnè, 3000 inh., and a grammar-school and copper-works; Agliè, 3000 inh., with a castle and a handsome park; S. Giorgio Canavese, 3300 inh., and a college; Locana, 5000 inh., with brass-works; Valperga, 2700 inh.; Pont, 2600 inh., in a delightful valley watered by the Orca and its affluent the Saona. In this valley are many natural curiosities, and the traces of silver and gold mines, said to have been once worked by the Romans. Copper is found in the Val d'Orca, and iron in the Val Brozzo, where there are several iron-works. There are several other small towns of above 2000 inh., such as Azeglio, Bolengo, Vische, S. Giusto, Pavone, Chiaverano, &c. (Neigebaur, *Gemälde Italiens*; *Calendario Sardo*; Saussure, *Voyages dans les Alpes*.)

IXA. [LEUCOSIANS.]

I'XALUS, a form of herbivorous Mammifers, placed, with doubt, by Mr. Ogilby under his family *Moschidæ*. That zoologist observes that the genus, founded upon the observation of a single specimen, may eventually prove to belong to a different family. He remarks that it differs little from the true Antelopes; but even supposing it to be correctly placed among the *Moschidæ*, other forms, he observes, are still wanting to fill up the chasms which evidently exist among that group. The type is *Ixalus Probaton*. (*Proc. Zool. Soc.*, part iv., p. 119.)

IXO'RA, a genus of Rubiaceous plants of the tribe Cinchonaceæ, so named, it is supposed, from the Indian god Iswara. The genus is characterized by having a small four-toothed calyx; corolla 1-petalled, funnel-shaped; tube long, with the four stamens in its mouth; ovary 2-celled, 1-seeded; style single; berry drupaceous, inferior, 2-seeded. The species are numerous, and chiefly confined to India and the Oriental Archipelago. They form shrubs or small trees, with opposite leaves, and stipules arising from a broad base, but acute at the apex. The flowers are in terminal corymbs, and are usually red, but sometimes white, and are generally highly ornamental, whence several are cultivated in our hothouses, where they require to be kept in a moist heat to thrive well. Some of the species are used medicinally, but not to any extent. Dr. Horsfield mentions *I. coccinea* as employed in Java as a stimulant, and Rheede two or three other species; but none appear to be possessed of any very active properties.

IXOS, a genus of birds established by M. Temminck, for those thrushes which have the bill shorter than usual, and embracing the greatest part of the *Brachypodinæ* and nearly the whole of the *Crateropodinæ* of Swainson. Ornithologists generally admit this genus; but Mr. Swainson is of opinion that, though it may be continued in artificial systems, it cannot be adopted in natural classification, since it includes genera long before defined, and unites under one name birds which actually belong to different families.

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VOLUME XIII.

J.

J, in the English language, has a sibilant sound, closely connected with that of the syllable *di* before a vowel. [ALPHABET, p. 379.] It has a similar sound in the French tongue; but in German it is pronounced altogether as our *y* before a vowel. What its pronunciation was in Latin may admit of dispute, for although it is generally laid down that its power with the Romans was the same as with the Germans, there is reason for thinking that our own sound of the letter was not unknown to the antient inhabitants of Italy. The name of Jupiter was undoubtedly written originally Diupiter, so Janus was at first Dianus, just as the goddess Diana was called by the rustics Jana. (See D and I.) The argument might be strengthened by comparing the Latin *jungo* with the Greek ζευγνυμι, Jupiter with Ζευ πατερ, &c., and also by referring to the modern Italian forms, *Giogo, giovare, giovenco, giovane*, &c. There is no absurdity in supposing that two pronunciations may have co-existed in the same country. As to the form of the letter *j*, it was originally identical with that of *i*, and the distinction between them is of recent date. Exactly in the same way, among the numerals used in medical prescriptions, it is the practice to write the last symbol for unity with a longer stroke, *vj, vij, viij*.

In the Spanish language *j* represents a guttural, and is now used instead of *x*, which had the same power: thus Jeres rather than Xeres is the name of the town which gives its title to the wine called by us sherry. For the changes to which *j* is liable, see D, G, and I.

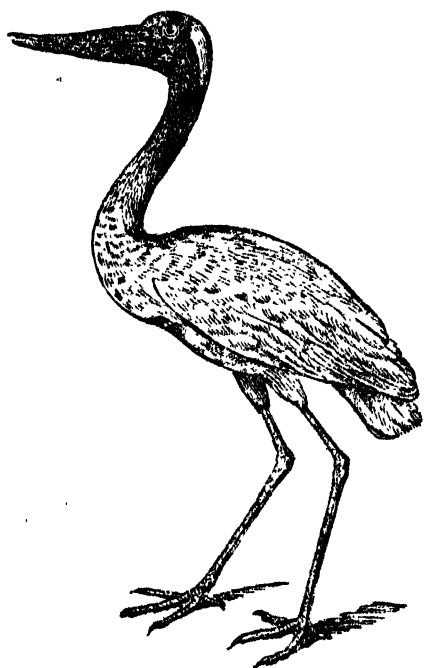
JA'BIRU, the name of a genus of Grallatorial or Wading Birds, *Mycteria* of Linnæus, and thus characterized:—

Bill long, conical, smooth, robust, compressed, and pointed; upper mandible trigonal and straight, the lower thicker and turned up. *Head* and *neck* more or less bare of feathers. Anterior *toes* united at the base by a membrane. *Size* gigantic.

Geographical Distribution of the Genus.—South America, Western Africa, Australasia.

Habits almost entirely the same with those of the Storks.

There are three species known, distributed geographically as above. We select *Mycteria Americana* as an example.



Mycteria Americana.

Description.—Very large in size, white; the *head* and *neck* (excepting the occiput) without feathers, and covered with a black skin, which becomes reddish towards the lower part. On the occiput are a few white feathers. *Bill* and *feet* black.

Locality, South America, where it frequents the borders of lakes and marshes, preying on reptiles and fish. [HERONS, vol. xii., pp. 165, 166.]

JABLONSKI, PAUL ERNEST, the son of Daniel Ernest Jablonski, a distinguished minister of the Protestant church, was born at Berlin in 1693. He was educated at the university of Frankfort on the Oder; where he applied himself with great diligence and success to the study of the Coptic and other Oriental languages. At the age of twenty-one he was sent at the expense of the Prussian government to the various public libraries in Europe, in order to pursue his studies and to make extracts from Coptic MSS. In 1720 he was appointed minister of the Protestant church at Liebenberg; and in 1722, professor of theology at Frankfort on the Oder; and also minister of the Protestant church in the same place. He died on the 13th of September, 1757.

The most important of Jablonski's works are:—'Pantheon Ægyptiorum, sive de Diis eorum Commentarius, cum Prolegomenis de Religione et Theologia Ægyptiorum,' 3 vols. 8vo., 1750-52; 'De Memnone Græcorum et Ægyptiorum, hujusque celeberrima in Thebaïde Statua,' 4to., 1753; 'Remphah Ægyptiorum Deus ab Israëlitis in Deserto cultus,' 8vo., 1731; 'Dissertationes Academicæ de terra Gosen,' 4to., 1735, 1736; 'Disquisitio de Lingua Lycaonica' (which is mentioned in the *Acts of the Apostles*, xiv. 11), 4to, 1714, 1724; 'Exercitatio Historico Theologica de Nestorianismo,' 8vo., 1724; 'De ultimis Pauli Apostoli Laboribus a Luca prætermissis,' 4to.. 1746; 'Institutiones Historiæ Christianæ Antiquioris,' 8vo., 1754; 'Institutiones Historiæ Christianæ recentioris,' 8vo., 1756. Several of these works have been republished with many additions and corrections by Te Water, under the title of 'Opuscula quibus Lingua et Antiquitates Ægyptiorum, difficilia Librorum Sacrorum Loca, et Historiæ Ecclesiasticæ Capita illustrantur,' &c., 4 vols. 8vo., Leyden, 1804-13.

JA'CAMAR. [KINGFISHERS.]

JA'CANA. [RALLIDÆ.]

JACCHUS, or IACCHUS (Mammalogy), the name of a genus of monkeys applied by Geoffroy, Desmarest, and others to the form denominated *Hapale* by Illiger, *Ouistitis* of the French, the type of which may be considered to be *Simia Jacchus* of Linnæus.

M. Geoffroy treats them as a family divided into two subgenera (*Hapale* and *Midas*), under the name of *Arctopitheci;* but the term *Arctopithecus*, it seems, had been applied by Gesner as a denomination for another animal, probably the Three-toed Sloth, whilst the latter uses *Galeopithecus* to designate the *Sagoin*.

Generic Character.—Upper intermediate incisors larger than the lateral ones, which are isolated on each side; lower incisors elongated, narrow, and vertical, the lateral ones longest; upper canine teeth conical and of moderate size; two lower ones very small.

Dental Formula: incisors $\frac{4}{4}$; canines $\frac{1-1}{1-1}$; molars $\frac{6-6}{6-6}$ $=36$.

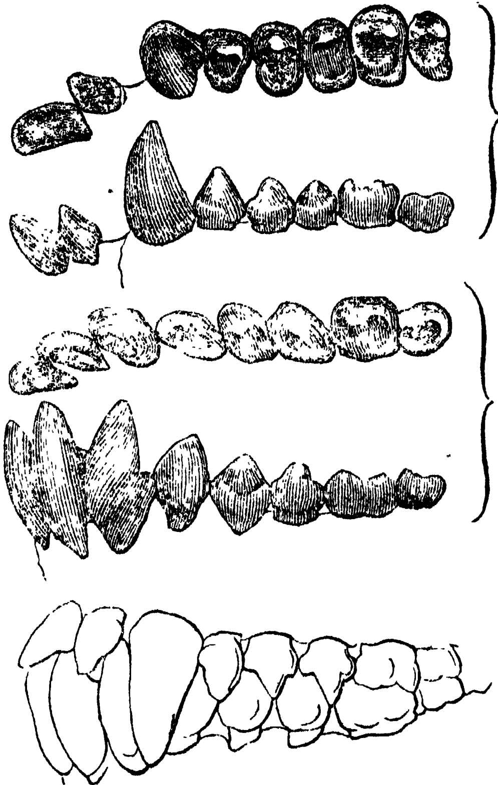
Size small, muzzle short, facial angle about 50°. Head round, prominent at the occiput; the five fingers armed with claws, with the exception of the thumbs of the posterior extremities, which are furnished with nails; thumb of the anterior extremities in the same direction as the fingers; fur very soft; tail full and handsome.

Geographical Distribution.—South America. How Ludolph, who figures two in his 'History of Ethiopia,' could have been so far misled as to place the form in that part of the world, does not appear.

The species, which are not few, have been separated into

two sections; the first consisting of those which have an annulated tail, *Jacchus vulgaris* for instance; and the second of those whose tail is not annulated, as *Jacchus melanurus*.

We select *Jacchus vulgaris* as our example.



Teeth of Jacchus four times larger than nature. (F. Cuvier.)

Description.—This appears to be the *Simia Jacchus* of Linnæus and others; *Callithrix Jacchus* of Erxleben; *Hapale Jacchus* of Illiger and Kuhl; *Cercopithecus Jacchus* of Blumenbach; *Cagui*, *Sagouin*, *Sagoin*, *Sanglain*, and *Sanglin*, of Edwards and various authors, the latter terms being probably derived from *Sahuim*, the name by which it is said to be known near Bahia; *Ouistiti* of Buffon and the French; *Striated Monkey* of Pennant.

Length of *body* about eight inches; *tail* rather more than eleven: *colour* olive-grey, darkest on the head and shoulders, where it becomes nearly black; tail and lower part of the back barred or annulated with pale grey; lower parts of extremities brownish-grey. *Face* of a flesh colour; two tufts of pale hair spring round the ears; front *claws* hooked and thick.

Locality, Guyana and Brazil.

Habits.—The habits of the genus generally are squirrel-like, though they are, occasionally at least, carnivorous. *Jacchus vulgaris*, in a wild state, is omnivorous, feeding on fruits, roots, seeds, insects, and little birds or nestlings. The individual (in captivity) from which Edwards took his drawing fed upon biscuits, fruit, greens, insects, snails, &c., and once, when loose, it suddenly snatched a Chinese gold-fish from a basin of water and devoured it: Mrs. Kennon, to whom it belonged, after this gave it live eels, which frightened it at first by twisting round its neck, but it soon mastered and ate them. Mrs. Moore, of Rio Janeiro, sent a living specimen of *Jacchus penicillatus*, which was said to have been obtained from Bahia, to the Zoological Society of London, with the following note: 'Like most monkeys, it will eat almost anything; but its chief and favourite food, in its wild state, is the banana. It is a very delicate animal, and requires great warmth; and its very beautiful tail is in this respect eminently conducive to the comfort of the little creature, who, on all occasions when he requires warmth, rolls himself up in the natural boa with which Providence has in its wisdom endowed him.'

The *Ouistitis*, or *Sanglins*, not unfrequently breed in confinement. Edwards notices a pair that bred in Portugal, and M. F. Cuvier possessed two which had young. Three little ones were born, and the female soon ate off the head of one; but the others beginning to suck, she became careful of them and affectionate to them. The male seemed more fond of them than the mother, and assisted her in her care of them. Lady Rolle addressed a letter to the secretary of the Zoological Society of London (February, 1835), giving an account of the birth of two young ones, the produce of a pair of *Ouistitis* (*Jacchus penicillatus*, Geoff.) in her ladyship's possession. The parents were obtained in London during the preceding summer, and the young were brought forth on the 1st January. One was born dead, but the other was surviving at the date of the letter, being then about six weeks old, and appearing likely to live. It was every day put on the table at the dessert, and fed upon sweet cake. Lady Rolle stated that the mother took great care of it, exactly in the manner described by Edwards in his 'Gleanings.' It was observed that young of the same species had been born at the Society's Gardens, but not living, and that a female in the collection of the president, the Earl of Derby, at Knowsley, had produced, about the same time as Lady Rolle's, two living and healthy young ones, which were then still thriving. (*Zool. Proc.*)



Jacchus vulgaris.

Mr. Gray places the form among the Anthropomorphous *Primates* in the family *Sariguidæ*, and in its last subfamily (the 5th), *Harpalina* (Hapalina?), which is immediately preceded by *Saguinina*.

Mr. Swainson, who arranges it under his family *Cebidæ*, gives the group the appellation of *Mouse Monkeys*, because the large cutting teeth in the lower jaw strongly indicate, in his opinion, 'a representation of the order *Glires*.' [MIDAS.]

JACKAL, or TSCHAKKAL, *Chacal* or *Loup doré* of the French, *Adive* of Buffon, *Canis Aureus* of Linnæus.

Dental formula that of the Dog. Pupil of the eye round like those of the Dog and Wolf.

Description. — Yellowish-grey above, whitish below, thighs and legs yellow, ears ruddy, muzzle very pointed, tail reaching hardly to the heel (properly so called). The colours sometimes vary, and the back and sides are described by Mr. Bennett as of mixed grey and black, and as abruptly and strikingly distinguished from the deep and uniform tawny of the shoulders, haunches, and legs. The head nearly of the same mixed shade with the upper surface of the body.

Geographical Distribution.—India, other parts of Asia, and Africa. Cuvier says that Jackals are met with from India and the environs of the Caspian Sea to Guinea, but that it is not certain that they are all of the same species.

Habits gregarious, hunting in packs, and the pests of the countries where they are found, and where they burrow in the earth. In their huntings the Jackals will frequently

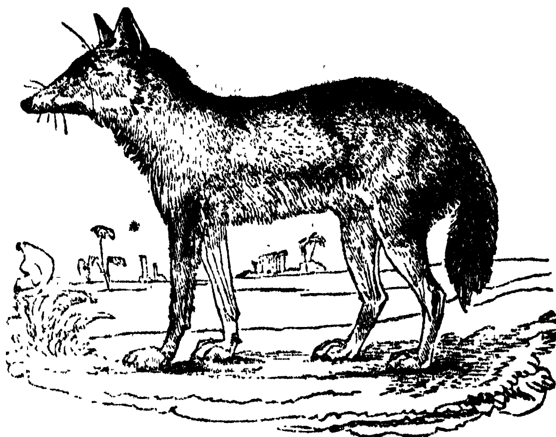
attack the larger quadrupeds, but the smaller animals and poultry are their most frequent prey. Their cry is very peculiar and piercing. Captain Beechey notices it as having something rather appalling when heard for the first time at night; and he remarks, that as they usually come in packs, the first shriek which is uttered is always the signal for a general chorus. 'We hardly know,' continues the Captain, 'a sound which partakes less of harmony than that which is at present in question; and indeed the sudden burst of the answering long-protracted scream, succeeding immediately to the opening note, is scarcely less impressive than the roll of the thunder-clap immediately after a flash of lightning. The effect of this music is very much increased when the first note is heard in the distance (a circumstance which often occurs), and the answering yell bursts out from several points at once, within a few yards or feet of the place where the auditors are sleeping.' These animals are said to devour the dead on the battle-field and to scratch away the earth from the shallow graves in order to feed on the corpses.

John Hunter (*Phil. Trans.*) has recorded the case of a female Jackal which whelped in this country. The period of gestation was about the same as that of the dog, and the whelps were blind at first.

The story of the Jackal being the lion's provider may have arisen from the notion that the yell of the pack gives notice to the lion that prey is on foot, or from the Jackal's being seen to feed on the remnants of the lion's quarry.

Cuvier observes that it is not certain that all the Jackals are similar ('of the same species'); those of Senegal, for example (*Canis Anthus*, F. Cuv.), he remarks, stand higher on the legs, and appear to have the muzzle sharper and the tail rather longer.

The offensive odour of the Jackal has been given as one of the reasons against reducing it to a state of domestication. We do not see what advantage is to be derived from such a process; but, if it were desirable, that objection, it seems, would not hold. Colonel Sykes, who notices it as the *Kholuh* of the Mahrattas, and as being numerous in Dukhun (Deccan), had in his possession at the same time a very large wild male and a domesticated female. The odour of the wild animal was almost unbearable; that of the domesticated Jackal was scarcely perceptible.



Jackal.

Some are of opinion that the three hundred foxes between whose tails Samson is said to have put firebrands in order that they might set fire to the crops of the Philistines (*Judges*, xv., 4, 5) were Jackals. Many of the modern Oriental names for the last-mentioned animals, *Chical* of the Turks, *Sciagal, Sciugal, Sciachal*, or *Shacal* of the Persians, come very near to the Hebrew word שׁוּעָל, *Shual*. Hasselquist, speaking of '*Canis aureus*, the Jackcall, Chical of the Turks,' says (translation), 'There are greater numbers of this species of Fox to be met with than the former (*Canis Vulpes*), particularly near Jaffa, about Gaza, and in Galilee. I leave others to determine which of these is the Fox of Samson. It was certainly one of these two animals.' This does not seem however to be quite so certain, for there are not wanting those—and Dr. Kennicott is one of them—who reject all quadrupedal aid as ancillary to the vengeance of him of Zorah. Dr. Kennicott alludes to the remark that the Hebrew word translated 'foxes' signifies also handfuls (*Ezek*. xiii. 19, 'handfuls of barley'), if the letter ו, which has been inserted or omitted elsewhere almost at pleasure, be left out. 'No less than seven Hebrew MSS. want that letter here,' says Dr. Kennicott in continuation, 'and read שׁעלים. Admitting this version, we see that Samson took three hundred handfuls (or sheaves) of corn, and one hundred and fifty firebrands; that he turned the sheaves end to end, and put a firebrand between the two ends in the midst; and then, setting the brands on fire, sent the fire into the standing corn of the Philistines.' Our limits will not allow us to dwell upon this subject, which the reader will find elaborately discussed by Dr. Harris and others.

JACKDAW, the well-known English name for *Corvus Monedula* of Linnæus.

JACKSAW, one of the provincial English names for the *Dun Diver*. [MERGANINÆ.]

JACKSON, WILLIAM, who alone is almost sufficient to refute the opinion too generally entertained, even in this country, that the English have no school of music, was born in 1730, at Exeter, of which place his father was a highly respectable tradesman. He there received a liberal education, and having evinced distinct proofs of musical genius, was placed under the tuition of the organist of the cathedral, but completed his professional studies in London, under the celebrated Travers, of the Chapel-Royal. He returned to and settled in his native city, and in 1777 was appointed sub-chanter, organist, lay-vicar, and master of the choristers of the cathedral.

Jackson first made himself known as a composer by the publication of *Twelve Songs*, which immediately spread his fame throughout the kingdom. His next work was *Six Sonatas for the Harpsichord*; but this proved unsuccessful: his power was in vocal music—in giving melodious expression to good lyric poetry, of which he always made a judicious choice, for he was too sensible a man to waste his strength in such nonsense-verses as are commonly set by the numberless pseudo-composers of the present day. His third work, *Six Elegies* for *Three Voices*, completely established his reputation; they are, and will ever continue to be, admired by all who have a cultivated, unprejudiced love of the art. This was followed by his Opera IV., consisting of twelve more songs, among which is, if we mistake not, the very lovely air, 'Go, gentle gales:' and subsequently he published two other sets of the same number of songs in each, many of which deserve to be rescued from that neglect to which fashion, that is, the rage for novelty, has condemned them. His *Twelve Canzonets for Two Voices*, all of them more or less ingenious and pleasing, were once the delight of every musical circle. Of these, 'Time has not thinned my flowing hair' has lost none of its charms; and 'Love in thine eyes for ever plays' is a duet familiarly known to most, if not all, persons of taste in the British isles. Of his three dramatic compositions *The Lord of the Manor* alone survives. The exquisitely tender air in this, 'Encompass'd in an angel's frame,' is one among the many admirable things in the opera; the words by General Burgoyne, who in a preface to the drama pays an exceedingly elegant well-deserved compliment to the composer, viewing him both as a musician and as a man.

'Originality and grace are the attributes of JACKSON *of Exeter*: there is in his works a total absence of those phrases—cant phrases they may be called—which, though fashionable and admired at the time, soon became vulgar and distasteful. He wrote not only for his own age, but for future ages. He is already admitted into the list of classical English composers, and will hereafter, when the 'venerable garb of antiquity' is thrown over him, be better known and more esteemed than at the present period; though even now all real judges of musical excellence justly appreciate his best productions. He was decried by his professional contemporaries, because superior to most of them in genius, and infinitely beyond them in education and in those attainments which become a gentleman. He was a critic too, and wrote as well as said caustic things. His mind was of large calibre; it was powerful and active; he thought for himself, and commonly thought right. His *Thirty Letters on various Subjects*, and his *Four Ages, together with Essays on various Subjects*, display the extent of his knowledge, the correctness of his judgment, and the originality of his conceptions. From those volumes music is not wholly excluded, though it occupies only a small portion of

them. But what he has written on the subject is much to the point, his criticism is just, and he has expressed his opinions in easy, appropriate language.' (*Supplement to Musical Library*.)

Jackson was no mean proficient in the sister art of painting: he chiefly employed his pencil in landscapes, making his friend Gainsborough his model; and it has been said, perhaps rather hyperbolically, that he occasionally imitated him so well, as almost to become a kind of rival. This very accomplished man died at the age of 73, leaving a widow, two sons, and a daughter. One of his sons accompanied Lord Macartney to China; his name and further history have eluded our inquiry. The other son, Francis James, filled, with great honour to himself, many diplomatic situations; he was successively secretary of legation at Berlin, minister plenipotentiary at Madrid, ambassador to the Ottoman Porte, and envoy extraordinary and minister plenipotentiary to the United States of America. He died some years ago, leaving a son and daughter.

JACKSON, PORT. [SIDNEY.]

JA'COBI, FREDERICK HENRY, a philosophical writer of Germany, was born at Düsseldorf, in 1743, and died at Munich, 10th March, 1819. He was distinguished, not so much as the author of a peculiar system of philosophy, as for the critical acumen and forcible eloquence with which he detected and exposed the incoherences and defects of the prevailing systems, of which he traced the inevitable consequences with great rigor and sagacity. Originally educated for a mercantile profession, Jacobi united the pursuits of literature to those of commerce until his appointment as councillor in the Hofkammer of his native city, which he obtained by the good offices of the Count von Golstein, enabled him to indulge his natural tastes and inclination by devoting his whole time and attention to literature. In this new career he sought to combine poetry with philosophy, and his earliest publication was a philosophical poem, entitled 'Friendship and Love,' which first appeared in 1779, but was republished two years afterwards under the simpler title of 'Woldemar.' In this year Jacobi was invited to Munich, and appointed geheimrath, in which situation he evinced the honesty and independence of his character by exposing publicly the injurious tendency and imprudence of the Bavarian system of finance. In 1781 he commenced an able controversy with Mendelsohn, by his work 'On the Doctrine of Spinosa,' which he further prosecuted in his 'Observations on Mendelsohn's Apology for the Doctrine of Spinosa.' By the essay, entitled 'David Hume, or Idealism and Realism,' he provoked the hostility of the followers of Kant, and that of the admirers of Fichte by his 'Sendschreiben an Fichte,' whose respect however, as well as that of most of his controversial opponents, he secured by the known sincerity of his character and opinions. When the troubles arising out of the French revolution extended to Germany, Jacobi retired to Holstein, whence he removed successively to Wandsbeck and Hamburg; from the latter he was called, in 1804, to Munich, to assist in the formation of the new Academy of Sciences, of which he was appointed president, in 1807. This dignity Jacobi resigned upon attaining his 70th year, but was allowed to retain the salary and emoluments. Shortly previously his work 'On Divine Things and on Revelation' (Leipz. 1811) had involved him in a bitter controversy with Schelling, who, in his answer, which bore the title 'Memorial to the Work on Divine Things,' professed to give the real position of Jacobi with respect to science and theism, or in other words, to philosophy and religion, and generally to literature. Notwithstanding the unfavourable estimate which this great philosopher drew therein of the literary and philosophical merits of Jacobi, he still maintains a high rank among sincere and honest inquirers after truth; and even if, exclusively occupied with detached speculations, he rather prepared than established a system of philosophy, the profoundness and originality of his views have furnished materials of which more systematic minds have not scrupled to avail themselves for the construction of their own theories.

As a poet, in which capacity he was greatly inferior to his brother (John George), Jacobi was a reflective rather than an imaginative thinker. His poetical merits are chiefly confined to vividness of description and to boldness of style. His philosophical writings, notwithstanding the want of all scientific method, are remarkable for the beauty of the exposition, which is conveyed in a form at once vigorous and harmonious. His views of philosophy, as far as they can be gathered from his scattered and occasional compositions on the subject, were rather of a sceptical than of a dogmatical character, and he denied the possibility of certainty in human knowledge. He maintained that all demonstrative systems must necessarily lead to fatalism, which however is irreconcileable with man's consciousness of the freedom of his rational nature. The general system of nature indeed, and man himself, so far as he is a part of that system, is pure mechanism; but in man there is unquestionably an energy which transcends and is superior to sense, or that faculty which is bound up with and regulated by the laws of nature. This higher energy is liberty, or reason, and consequently sense and reason distinguish to man two distinct spheres of his activity—the sensible or visible world, and the invisible or intelligible. The existence of these worlds no more admits of demonstrative proof than that of sense and reason themselves. Now sense and reason are the supreme and ultimate principles of all intellectual operations, and as such legitimate them, while they themselves do not receive their legitimization from aught else; and the existence of sense and reason necessarily implies the existence of sensible and intelligible objects about which they are conversant. But this existing system of things cannot have originally proceeded either from nature or from man's intellect or reason, for both nature and the human mind are finite and conditionate, and there must be something infinite and unconditionate, superior to and independent both of nature and man, to be the source and principle of all things. This being is God. Now as man's liberty consists in his personality or absolute individuality, for this constitutes his proper essence, while the mechanism of nature is hereby distinguished from man, that none of its members are individual of character, therefore that which is superior both to nature and to man must be perfectly and supremely individual; God consequently is one only, and strictly personal. Moreover, as the ground of all subsistence, he cannot be without subsistence; and as the principle of reason, he cannot be irrational. Of the existence of this divine intelligence however all direct proof is as impossible as a demonstration of existence simply. Generally indeed nothing can be known except upon testimony, and whatever rests on testimony is not certainty but *faith*, and such a faith or belief, when its object is the existence of a good and supreme being, is religion.

Jacobi's complete works have been published in 6 vols., Leipz. 1819-20.

JACOBINS is the name of a faction which exercised a great influence on the events of the French Revolution. This faction originated in a political club formed at Versailles, about the time of the meeting of the first National Assembly, and which was composed chiefly of deputies from Britanny, who were most determined against the court and the old monarchy, and some also from the South of France, among whom was Mirabeau. When the National Assembly removed its sittings to Paris (October 19, 1789), the Breton club followed it, and soon after established their meetings in the lately suppressed convent of the Jacobins, or Dominican monks, in the Rue St. Honoré. From this circumstance the club and the powerful party which grew from it assumed the name of Jacobins. During the year 1790 the club increased its numbers by admitting many men known for violent principles, which tended not to the establishment of a constitutional throne, but to the subversion of the monarchy. A schism broke out between these and the original Jacobins, upon which Danton, Marat, and other revolutionists seceded from the club, and formed themselves into a separate club called 'Les Cordeliers,' from their meetings being held in a suppressed convent of Franciscan friars. [DANTON.] These men openly advocated massacre, proscription, and confiscation, as the means of establishing the sovereignty of the people. In 1791 the Cordeliers reunited themselves with the Jacobin club, from which they expelled the less fanatical members, such as Louis Stanislas Freron, Legendre, and others. From that time, and especially in the following year, 1792, the Jacobin club assumed the ascendency over the legislature; the measures previously discussed and carried in the club being forced upon the assembly by the votes of the numerous Jacobin members, and by the out-door influence of the pikemen of the suburbs, with whom the club was in close connexion. The attack on the Tuileries in August, 1792, the massacres of the following September, the suppression of royalty, and most of

the measures of the reign of terror, originated with the club of the Jacobins. [COMMITTEE OF PUBLIC SAFETY.] The club had affiliations all over France. After the fall of Robespierre in July, 1794, the convention passed a resolution forbidding all popular assemblies from interfering with the deliberations of the legislature. The Jacobins however having attempted an insurrection in November, 1794, in order to save one of their members, Carrier, who had been condemned to death for his atrocities at Nantes, the convention ordered the club to be shut up; and Legendre, one of its former members, proceeded with an armed force to dissolve the meeting, and closed the hall. The spirit of the club however survived in its numerous adherents, and continued to struggle against the legislature and the Executive Directory, until Bonaparte put an end to all factions, and restored order in France. The name of Jacobin has since continued to be used, though often improperly applied, like other party names, to denote men of extreme democratical principles, who wish for the subversion of monarchy and of all social distinctions, and are not over-scrupulous about the means of effecting their object.

JACOBITES. [EUTYCHIANS.]

JADE, a name which has been given to several minerals which resemble each other but little, except in colour, and therefore it is one which it would be well should fall into disuse.

Serpentine, nephrite, and Saussurite have all been described under the name of jade. Yu, or Chinese jade, is supposed to be prehnite.

JAEN, an intendencia, or administrative province, of Spain, once a Moorish kingdom, is included in the geographical division of the Peninsula called ANDALUSIA. The province of Jaen consists in great measure of the upper basin of the Guadalquivir, and of the numerous streams which contribute to the formation of that river, and it lies between the Sierra Morena on the north, which divides it from Castile, the great southern range or Sierra Nevada on the south towards Granada, and the Sierra de Cazorla on the east, which forms the connecting link between the other two, on the borders of Murcia. To the west the ground slopes with the course of the Guadalquivir towards Cordova. Numerous offsets of the above chains enter and cross the territory of Jaen; such are the Sierra de Bedmar, Sierra de Ubeda, &c. The province of Jaen is 75 miles from east to west, and nearly as much from north to south, and its area is estimated at about 4000 square miles, with a population of 277,000 inhabitants, distributed among 71 pueblos or communes. The province is divided into five partidos or districts, Jaen, Andujar, Baeza, Martos, and Ubeda. The soil in the valleys is extremely fertile, but very imperfectly cultivated. The produce is wine, oil, corn, vegetables and fruits of every kind; honey and silk are also gathered. The mountains abound with rich pastures; sheep and a fine breed of horses are the principal cattle in the country. Jaen, the capital of the province, is a bishop's see, with a fine cathedral, and has 19,000 inhabitants. At Cazalla, south of Jaen, are mines of lead and silver, and veins of copper are found in various parts of the province. In the northern part, at the foot of the Sierra Morena, is the German colony of La Carolina, founded by the philanthropist Olavides, in 1767. (Miñano; Bowles; Ponz; Bourgoing.)

JAEN. [ECUADOR, vol. ix., p. 267.]

JÆRA, or JAËRA. [ISOPODA, vol. xiii., p. 55.]

JAFFA. [SYRIA.]

JAFFNAPATAM, the principal town of the province of Jaffna in the island of Ceylon, is situated in 9° 47′ N. lat. and 80° 9′ E. long.; 215 miles north from Colombo, and 296 south-west from Madras. It possesses a large fort built in the form of a pentagon, with five bastions, furnished with a broad moat and an extensive glacis; and having within its walls a church in the form of a Greek cross, a commandant's house, and some other good buildings, besides barracks and accommodations for soldiers. The town stands to the eastward at the distance of half a mile, and contains several broad parallel streets intersected by smaller ones. The houses are for the most part built with brick. The majority of the inhabitants of the town formerly consisted of the Dutch and their descendants, but since the British conquest many have emigrated to different parts of the island, and some have gone to Batavia. The bazaar is abundantly supplied with the necessaries of life at a cheap rate. In the neighbourhood there is a church belonging to the Tamul Protestants, called St. John's, in which the Tamul colonial chaplain of the district officiates. The Hindus have a large temple in the neighbouring town of Wannapanny, which far exceeds in grandeur all the rest in the province. It is ornamented with an accumulation of small towers, and enclosed by a wall having a large gateway. It was founded and endowed by one Wyti Linga Chetty, about forty years ago. There is a band of dancing girls attached to the temple, who enliven the processions with their dancing.

Jaffnapatam is not accessible to vessels of any considerable size, owing to the shallowness of the water. The cargoes of the larger vessels are unloaded at Kails, and conveyed up to the town in small boats.

Jaffnapatam is the seat of a government agent, who is deputy fiscal, and of a provincial judge, who are gentlemen of the civil service. They form a minor court, to decide on appeals from the courts of the subordinate magistrates of the province of Jaffna.

JAGANATH. [JUGGERNAUTH.]

JAGER. (Ornithology.) [LARIDÆ.]

JAGUAR. [LEOPARDS.]

JAINAS, a religious sect of the Hindus. The name is derived from the Sanskrit *jina*, 'victorious,' which is the generic name of the deified saints of this sect.

The Jainas are very numerous in the southern and western provinces of Hindustan; they are principally engaged in commerce, and from their wealth and influence form a very important division of the population of the country. The history and opinions of this sect are also interesting from their striking similarity to the chief peculiarities of the religion of Buddha. The earliest information concerning this sect was given in the 9th vol. of the 'Asiatic Researches,' in an 'Account of the Jains, collected from a priest of this sect, at Mudgeri, translated for Major Mackenzie;' in 'Particulars of the Jains,' by Dr Buchanan; and in 'Observations on the sect of Jains,' by Colebrooke. Several particulars concerning them are also given in Buchanan's 'Journey from Madras through Mysore,' &c.; Wilks's 'Historical Sketch of the South of India;' in the work of the Abbé du Bois; and in Ward's 'View of the History, Literature, and Religion of the Hindus.' Information still more important is given in the 1st volume of the 'Transactions of the Royal Asiatic Society,' by Colebrooke, 'On the Philosophy of the Hindus;' by Major Delamain, 'On the Srâwaks, or Jains;' by Colebrooke, Dr. Hamilton, and Col. Franklin, 'On Inscriptions in Jain Temples in Behar;' by Dr. Hamilton, 'On the Srâwaks, or Jains;' and also in the 2nd volume of the Transactions, by Major Todd, 'On the Religious Establishments in Mewar.' But the most complete account of this sect is given by Prof. Wilson, in his 'Sketch of the Religious Sects of the Hindus.' (*As. Res.*, vol. xvii.)

A view of the literature of the Jainas is given by Wilson in his 'Descriptive Catalogue of the MSS., &c., of Col. Mackenzie,' vol. ii., pp. 144-162. The Jainas have their own Purânas and other religious works, which are principally devoted to the history of the Tôrthankaras, or deified teachers of the sect. The chief Purânas are supposed to have been written by Jina Sena Achârya, who was probably the spiritual preceptor of Amoghaversha, king of Kânchî, at the end of the ninth century of the Christian æra. They have also their own works on astronomy, astrology, medicine, the mathematical sciences, and the form and disposition of the universe, of which a list is given in Wilson's 'Descriptive Catalogue.' 'But the list there given is very far from including the whole of Jain literature, or even a considerable proportion. The books there alluded to are in fact confined to Southern India, and are written in Sanskrit or the dialects of the peninsula; but every province of Hindustan can produce Jain compositions, either in Sanskrit or its vernacular idiom; whilst many of the books, and especially those that may be regarded as their Scriptural authorities, are written in the Prakrit or Magadhi, a dialect which, with the Jains as well as the Bauddhas, is considered to be the appropriate vehicle of their sacred literature.' (Wilson, *As. Res.*, vol. xvii., p. 242-3.) The Jainas are also said to have a number of works entitled Siddhântas and Agamas, which are to them what the Vedas are to the Brahmanical Hindus.

The Jainas are considered by the Brahmans to form no part of the Hindu church. The principal points of difference between them and the Brahmanical Hindus are:—

1st, a denial of the divine origin of the Vedas; 2dly, the worship of certain holy mortals who have acquired by self-mortification and penance a power which renders them superior to the gods; and 3dly, extreme tenderness for animal life. These doctrines and customs are essentially the same as those of the Buddhists. The Jainas do not entirely reject the gods of the Hindu mythology; but they consider them greatly inferior to the Jinas, who are the objects of their religious adoration. The Jainas enumerate 72 mortals who have raised themselves to the rank of Jinas by their virtue and self-mortification; of whom 24 belong to the former age, 24 to the present, and 24 to the age to come. The statues of all or part of these are in all their temples, sculptured in black or white marble. They are distinguished from each other in colour and stature: two are represented as red, two as white, two as blue, two as black, and the rest as of a golden hue or yellowish-brown. Of these Jinas the most celebrated are Pârsvanâtha and Mahâvira, who alone can be regarded as having any historical existence. The last Jina is said, according to some accounts, to have died at the age of seventy-two, about B.C. 500; but, according to others, about B.C. 663, two hundred and fifty years after the preceding Jina Pârsvanâtha: but these dates, in common with most others in early Hindu history, are very uncertain.

The origin of this sect has been a subject of much dispute. Some have endeavoured to prove that Buddhism and Jinism are more antient than the Brahmanical religion; but several arguments have already been brought forward in another part of this work which render this hypothesis exceedingly improbable. [BUDDHA, vol. v., p. 526-7.] It has, on the contrary, been maintained with greater probability, from the absence of all allusion to Jinism in the antient Brahmanical and Buddhistic works, and from the comparatively late date of all inscriptions and monuments relating to the Jainas which have yet been discovered, none being earlier than the ninth century, that the sect of the Jainas did not become of any importance till the eighth or ninth century of the Christian æra. The striking similarity between the Buddhists and Jainas renders it probable that they had the same origin; and that Jinism is merely another form of Buddhism, accommodated to the prejudices of the Brahmanical Hindus. In the southern provinces of Hindustan, where the Jainas are the most numerous, the distinction of castes is preserved among this sect; but it appears probable, from many circumstances, that originally they had no distinction of caste; and even in the present day in the upper provinces, the Jainas all profess to be of one caste, namely, the Vaisyas, which is equivalent to their being of no caste at all. The Jainas also allow Brahmans to officiate as the priests of their temples. The period in which we have supposed Jinism to have first risen into importance corresponds with the time in which the Buddhists were finally expelled from Hindustan. (Wilson's *Sanskrit Dictionary*, 1st edit., preface, pp. xv.-xx.) It therefore appears probable that those Buddhists who were allowed to remain adopted the opinions and practices of Jinism, which may previously have existed as an insignificant division of the Buddhistic faith. In the eleventh and twelfth centuries the religion of the Jainas appears to have been more widely diffused than at any other period. Many princes in the southern part of the peninsula embraced this faith; but it gradually lost much of its power and influence, in consequence of the rapid progress of the Vaishnavas and Saivas. [HINDUSTAN, vol. xii., p. 233.]

The Jainas were antiently called Arhatas, and are divided into two sects, of which the former is called Vivasanas, Muktavasanas, Mucktâmbaras, or Digambaras, in reference to the nakedness of this order; and the latter Swetâmbaras, 'clad in white,' because the teachers of this sect wear white garments. The former are the more antient. In the early philosophical writings of the Hindus, in which the Jainas are mentioned, they are almost always called Digambaras, or Nagnas, 'naked.' The term Jaina rarely occurs, and that of Swetâmbara still more rarely. These two sects, though differing from each other in very few points, oppose one another with the bitterest animosity. A few years ago the British government at Benares was obliged to call in the military to put down a riot in the city, which had been produced by the quarrels of these sects.

The Jainas are also divided into Yatis and Srâvakas, clerical and lay; the former of whom subsist upon the alms of the latter. The religious ritual of the Jainas is very simple. The Yatis dispense with acts of devotion at their pleasure; and the Srâvakas are only bound to visit a temple daily, where some of the images of the Jinas are erected, and make a trifling offering of fruit and flowers, accompanied by a short prayer. The Jaina temples are generally superior in size and beauty to those which belong to the Brahmanical religion. Bishop Heber (*Journal*, i., p. 292) has given us an account of his visit to one of these temples, from which strangers are usually excluded with jealous precautions. 'The priest led us,' he says, 'into a succession of six small rooms, with an altar at the end of each, not unlike those in Roman Catholic chapels, with a little niche on one side, resembling what in such churches they call the *piscina*. In the centre of each room was a large tray with rice and ghee strongly perfumed, apparently as an offering, and men seated on their heels on the floor, with their hands folded as in prayer or religious contemplation. Over each of the altars was an altar-piece, a large bas-relief in marble, containing, the first five, the last in succession twenty-five figures, all of men sitting cross-legged, one considerably larger than the rest, and represented as a negro. He, the priest said, was their god; the rest were the different bodies he had assumed at different epochs, when he had become incarnate to instruct mankind. The doctrines he had delivered on these occasions make up their theology, and the progress which any one has made in these mysteries entitles him to worship in one or more of the successive apartments which were shown us.'

The moral code of the Jainas is expressed in five *Mahâvratas*, or 'great duties:' 1st, refraining from injury to life; 2nd, truth; 3rd, honesty; 4th, chastity; 5th, freedom from worldly desires. There are also four *Dhermas*, or 'merits:' liberality, gentleness, piety, and penance.

JALAP. [CONVOLVULUS JALAPA.]

JALAPA. [MEXICO.]

JALISCO. [MEXICO.]

JALLOFFS, or YALLOFFS, are a negro tribe who occupy a considerable tract of country between the rivers Senegal and Gambia. They are considered as the finest race of negroes in this part of Africa; they are tall and well made, their features are regular, and their physiognomy open. Though bordering on the Foolahs and Mandingos they differ from both, not only in language, but in features. The noses of the Jalloffs are not so much depressed nor the lips so protuberant as among the generality of Africans, but their skin is of the deepest black. They are chiefly employed in agriculture, and have made some progress in the useful arts, especially in the manufacture of cotton cloth, which they make better than any of the neighbouring tribes. Though Mohammedans they have not adopted the system of the Arabic numbers, but count only up to five, so that six is expressed among them by five and one, seven by five and two, and so on. They are divided into several independent states, or kingdoms, which are frequently at war either with their neighbours or with each other. (Mungo Park's *First Travels into the Interior of Africa*; Golberry's *Fragments*.)

JAMAICA, one of the Greater Antilles, and the most important possession of the British in the West Indies, extends from 76° 15′ to 78° 25′ W. long., and from 17° 40′ to 18° 30′ N. lat. Its length from east to west is nearly 150 miles, and its width may on an average be 40 miles. It contains, according to Mr. Robertson's survey, 2,724,262 acres, or 4256 square miles, and is much less in extent than the county of York. Only 1,100,000 acres are stated to be under cultivation.

The surface of this island is very uneven, and the tracts which are level probably occupy less than one-twentieth of its area, but it is only the eastern part that can properly be called mountainous. This part is almost entirely filled up by the Blue Mountains, whose principal ridge occupies the middle of it, and runs nearly east and west. This range varies from 5000 to 6000 feet in elevation; its summit is in some places so narrow as not to be more than three or four yards across. Its numerous offsets run south and south-east, or north and north-west. On one of the latter offsets rise three peaks, of which the most northern and the highest attains an elevation of 7150 feet above the sea. The western boundary of this mountain-region is formed by a ridge, running across the whole island from south-east to north-west. This ridge begins on the south at Yallah Point, and terminates to the north-east of the mouth of the Agua Alta, or Wagwater river. It rises to a considerable height, frequently to 2500 and 3000 feet; and S. Catherine's Peak,

at the point where it is united to the range of the Blue Mountains, is 4500 feet above the sea-level. The declivities of the mountains are rather steep, partly bare, and partly covered with woods, but the level summits are generally overgrown with trees. The valleys are mostly narrow, and contain but little level ground, with the exception of the vale of Bath, which extends about eight miles from the town of that name to the mouth of the Plantain Garden river, near the promontory of Morant Point, the most eastern cape of the island. This vale is about one mile and a half wide, and covered with sugar plantations.

West of the range in which S. Catherine's Peak stands the mountains subside, and are divided from those farther west by a depression which extends across the island over the plain of Liguanea and the hilly country which encloses the banks of the Wagwater river. Yet north of the plain the country seems to be 1000 feet above the sea-level, or nearly so. The greatest plain in the island is that of Liguanea, which begins a few miles east of Kingston, and extends westward to a point west of Old Harbour, a distance of about thirty miles: its average breadth is about five miles. The western portion of this plain has a considerable inclination. It is defended from the sea by the Palisados, a sand-bank several miles in length, which joins the town of Port Royal to the mainland of the island. A part of this plain consists of savannahs, or natural pasture-ground, covered with grass. West of Port Henderson a range of low hills called Healthshire Hills lie betwen the plain and the sea.

The plain of Liguanea is divided from the plain of Vere by a narrow range of low hills, which approach the sea west of Old Harbour, near Salt River Bay. The plain of Vere extends from south-east to north-west about 18 miles, with an average breadth of 7 or 8 miles. On the south-east of this plain is the Portland Ridge, which terminates in Portland Point, the most southern cape of Jamaica. On the north-west it is joined by the Mile Gully, a picturesque valley, several miles in length, traversed by the upper course of the Minho river. The soil of the plain of Vere is of moderate fertility, and mostly used as pasture-ground.

The mountains which enclose these plains on the north rise with a steep and abrupt ascent, but they do not attain a great elevation, hardly any summit being 3000 feet high, and most of them not 2000 feet. These mountains do not occupy the whole of the country, but enclose valleys of considerable extent and fertility, and the basin of St. Thomas-in-the-Vale, a plain embosomed in hills, about 9 miles long and 2½ miles across, which is covered with sugar plantations, and is very fertile. Towards the northern coast the mountains sink down into low and well-wooded hills.

The mountains, which cover nearly the whole of the island west of the basin of St. Thomas-in-the-Vale, do not rise much higher than those which enclose the basin. Their mean elevation falls short of 2000 feet, and few of their summits attain more than that elevation. The highest seems to be the Peak near Blewfields, not far from the southern coast, which rises to 2560 feet. Properly speaking, the ridges do not extend in one general line, but intersect each other in various direction, so as to form valleys, which open to nearly every point of the compass. Near the central line of the island, the hills present the characteristics of the limestone formation, of which they consist. Caverns occur in several places, and some of them are very extensive. In the midst of the hills are also cavities and depressions, sometimes of considerable extent. The water which runs down from the hills or falls into these cavities during the rains forms small rivers, which flow for a short distance and then disappear in sink-holes, and sometimes come again to the surface and again sink. These districts are only provided with running water during the rains, and the inhabitants are obliged to have recourse to tanks or cisterns, in which they collect the rain-water for the dry seasons. In the western part of the island the level grounds are not of great extent. The largest plains are the Pedro Plains, near Great Pedro Point, and the Savanna la Mar, towards South Negril Point, the most western cape of the island. A considerable portion of these plains is low and covered with swamps. No plains occur on the northern coast. The country between Montego Bay on the west and St. Ann's Bay on the east consists only of low though abrupt and precipitous hills; the valleys between them are covered with high forest-trees, which exhibit a very luxuriant vegetation.

Except the districts which lie within the limestone formation above mentioned, Jamaica has the advantage of being well watered by numerous rivers, rivulets, and springs. None of the rivers are navigable, except the Black River, in the parish of St. Elizabeth, by which goods are brought down and carried up about 30 miles in flat-bottomed boats and canoes. But the other rivers are of great importance for the water which they supply for the irrigation of the plantations, the numerous mills which they turn, and the beauty and interest that they give to the country through which they flow. Some of them form beautiful cascades.

The want of river navigation can hardly be felt in an island like Jamaica, which has a coast-line of more than 500 miles, in which hardly any place is more than 30 miles from the sea, and whose shores are sufficiently indented to supply it with numerous harbours and other shelters for shipping. There are 30 principal harbours, besides more than double that number of bays, creeks, and coves, capable of affording more or less shelter to vessels. The safest and most capacious of the harbours are those of Port Morant, Kingston, and Old Harbour on the southern, and those of Lucia and St. Antonio on the northern shores.

The climate of Jamaica is considered exceedingly hot, but this is only the case in the lower plains along the southern coast. The mean heat of the summer months (from June to November) is about 80°, whilst the mean heat of the other six months does not exceed 75°. In summer the thermometer sometimes rises to 96°, and occasionally, though rarely, to 100°. In winter it sinks to 69°. But the changes of the temperature are very slow and gradual, the difference between noon and midnight rarely exceeding 5° or 6°. The mean heat on the hills, which are 1000 feet and upwards above the sea, in summer is stated to be 75°, and in winter between 70° and 72°, though the thermometer occasionally sinks to 55°, and on the higher mountains even to 48°. Snow has never been observed, even on the most elevated peaks; hail is not a rare occurrence on them, but it melts as soon as it reaches the ground. The climate is cooler and more salubrious on the north side of the island than on the south. The heat of the low coast is considerably diminished by the daily sea-breeze, which sets in generally about nine o'clock in the morning and ceases only towards sunset. Its salubrious effects are so obvious, that it has obtained from the seamen the name of the *doctor*. During the hottest part of the day, and in the most sultry months, a succession of light flying clouds continually pass over the sun, and, by interrupting its rays, contribute to moderate the heat.

In Jamaica there are two rainy and two dry seasons. The spring rains begin some time after the sun has passed the equator, in the middle of April or beginning of May. But in these months the rains are generally partial, and come down only in showers: the dry weather frequently continues to the month of June, especially on the southern side of the island. The heavy rains commence in June or even later, and last about two months; they are by far the most violent of all that occur during the year, and at this time the air is most intolerably sultry. This intense heat, joined to a still breathless atmosphere, is a presage of the approaching torrents. The clouds hastily gather, and form into a compact mass, overspreading the sky, which just before was cloudless and serene. A tremendous peal of thunder bursts from these dark clouds, and in a few minutes the rain descends in torrents, of which no one can form an idea who has not witnessed them. During the continuance of the rain the heavens are rent with incessant peals of thunder and quick and vivid flashes of lightning. These rains set in regularly every day, and continue from two to three hours, sometimes for the space of several weeks. Sometimes very heavy rain descends for several days and nights with little intermission. The autumnal or *fall rains*, as they are called by the planters, come in October and November: they are by no means so heavy as those of the spring, nor are they usually accompanied with thunder and lightning, but they are often attended with heavy gusts of wind from the north. In the mountains the rains are earlier, more frequent, and more heavy than in the low country.

Jamaica is from time to time visited by those terrific phenomena called hurricanes. They generally set in from the north or north-west, but only in the summer months between the two rainy seasons, which months are therefore called

the hurricane months in the West Indies. They are usually succeeded by long droughts, by which those crops which are spared by the tempest are arrested in their growth, and a famine is the consequence. But hurricanes occur less frequently in Jamaica than in the Lesser Antilles.

The low tracts along the coast are unhealthy, but the hilly and mountainous country is much less so. The most common diseases are the yellow fever, common bilious fever, and the typhus fever; the first is by far the most destructive, especially to new comers, who are not yet inured to the climate.

The staple articles of the island occupy the greatest portion of the time and industry of the agriculturist, but he does not neglect the cultivation of several kinds of grain, of ground provisions, and even of grasses for the numerous herds of cattle which are kept. Sugar, rum, and molasses form by far the most important articles of export. The sugar plantations are very numerous and extensive, especially in the lower and warmer tracts of the island. On the hills and their declivities coffee is cultivated to a great extent. Next to these the pimento plantations supply the most important article of export. Arrowroot, indigo, which formerly was much more cultivated than at present, ginger, turmeric, and cacao are also cultivated. The last-mentioned article has been gradually neglected, and at present little more is raised than is sufficient for the consumption of the inhabitants. A considerable quantity of castor-oil is produced, but the greater part is consumed in the island. Tobacco is only cultivated by the negroes for their own use, and it is inferior to that of Cuba.

No kind of European corn is raised in Jamaica. Indian corn is universally cultivated, and yields an abundant produce; two and even three crops of it can be raised within the year. Guinea-corn is not much raised on the north side of the island, but in some districts on the south the negroes chiefly subsist on this grain, which is adapted to resist the two greatest obstacles to vegetation, poverty of soil and drought. Rice could be raised on the low and marshy lands, but it is not an object of attention.

A variety of wholesome and nutritious roots cultivated in this island are called by the name of *ground provisions;* such as the yam (Dioscorea alata), cassava (Jatropha Manihot), the sweet potato (Convolvulus Batatas), and some other roots. As these roots are not liable to sustain very severe injury from the frequent storms, or the hurricanes, every plantation has several acres planted with such provisions, over and above the negro-grounds and the plantain-walks.

A few kinds of grass are cultivated for cattle. The most important is the Guinea-grass, a hardy plant, which covers the rugged and stony portions of land, and yields three and sometimes four cuttings, or as many grazings, in the year. The Scotch grass grows with great luxuriance by the sides of the rivers and other moist situations; but it cannot be cultivated to a great extent.

None of the European fruits arrive at perfection except grapes. Apples are of very inferior quality and peaches rarely produce fruit. No other kinds succeed in any degree except a few tolerable strawberries. But there is a great abundance and variety of other delicious fruits, as the pine-apple, the orange, the shaddock, the pomegranate, the fig, the granadilla, the sapodilla, the star-apple, the sweet-sop, the sweet-lemon, the citron, the avocado-pear &c. Several exotics have been introduced within the last sixty years, as the mango, the cherimoyer, the bread-fruit, &c. But the most important is the plantain, or banana, which is extensively cultivated on every plantation.

The forests of Jamaica abound with a great variety of the most valuable woods. Some of them, which are susceptible of the highest polish, are too hard to be used in cabinet-work. The most beautiful woods for such work are the mahogany, the bread-nut hearts, and the satin-wood. The Jamaica mahogany is superior to that of Cuba or Belize, but there are not many mahogany-trees now remaining. The bread-nut tree is still abundant in most parts. The cedar-tree attains a great size, but it is not of so fine a grain as that of the Levant. Other trees produce dye-woods, as the fustic, the logwood, &c. The cotton-tree is the largest of all, but is only used for making canoes, which are hollowed out from the trunks; its cotton is employed for stuffing beds. The bamboo grows wild, and is also cultivated. The cabbage-palm (areca oleracea) and the cocoa-nut-tree are the most useful trees of the palm tribe. Notwithstanding this abundance of useful trees, white oak is imported for rum-puncheons, and considerable quantities of pine of all dimensions from the United States, this wood being sold at a lower price than the native timber.

The horned cattle are very numerous, oxen being employed in the waggons, which bring down the produce to the wharfs, and also in carts and in the plough. The horses are of a middle size, hardy and active, but only fitted for the saddle and harness. Mules are numerous, and employed in the sugar-mills and in conveying the sugar-canes to the works. Sheep and goats abound; many of the former have no fleece, and are covered with hair, like goats. Hogs are very plentiful: they are of a smaller size than the English hog, but their flesh is superior in delicacy to the British or American pork. All kinds of poultry are raised in the greatest abundance, excepting geese and the common duck. But the muscovy-duck, the turkey, the guinea-fowl, and the common-fowl thrive very well. Domestic pigeons likewise abound. Rats exist in incredible numbers, and destroy about one-twentieth part of the sugar-canes throughout the island. Fish abound in the sea and rivers. The alligator appears in some of the largest of the rivers, but does not attack men.

No metal but lead is known to exist. There are some salt-springs.

Jamaica is politically divided into three counties, Surrey, Middlesex, and Cornwall, and contains one city, Kingston, and thirty-three towns and villages. The counties are subdivided into 21 parishes.

1. The county of Surrey extends over the eastern portion of the island, comprehending the whole of the region of the Blue Mountains and the eastern portion of the Plain of Liguanea, or that which commonly passes by that name. In this division are Port Antonio, Morant Bay, and the harbour of Kingston. Kingston is a considerable city and a place of great trade, with a population of more than 33,000 persons of all descriptions. It is regularly built, and contains many good houses, two churches, and some charitable institutions; also five schools. The harbour is protected by the narrow slip of land on whose western extremity Port Royal is built. The greatest part of the produce of the southern districts is sent to Kingston and hence exported to Europe or America. Port Royal, once the capital of the island, has been repeatedly destroyed by earthquakes, hurricanes, and fire, but is still a considerable place, as its harbour is the station for the ships of war, and it contains the naval arsenal and good fortifications. The bulk of its inhabitants are people of colour. Morant Bay, nearly at an equal distance between Port Royal and Morant Point, carries on a considerable trade and is a thriving place. The population is between 6000 and 7000. Antonio has a good harbour, but little trade.

2. The county of Middlesex occupies the central part of the island, comprehending on the south the western portion of the plain of Liguanea, or the plains of St. Catherine and St. Dorothy, with the whole of the plain of Vere and the basin of St. Thomas-in-the-Vale; also the hills enclosing these level grounds, and the hilly and mountainous country which extends along the northern shores from the mouth of the Wagwater River to Rio Bueno Harbour. On its southern coast are Port Henderson and Old Harbour; but they are only visited by small vessels, which carry the produce of the country to Kingston. On the northern shores are Annotto Bay, Maria, and St. Ann's Bay, which carry on some commerce by sea, especially Annotto Bay, where there is a small but thriving town. On St. Catherine's plain is built the town of S. Jago de la Vega, commonly called Spanish Town, which is considered the capital of the island, being the seat of government. It is a small town with about 6000 inhabitants, but embellished by the king's house (the residence of the governor) and the public offices. The superior courts sit here. It has a free-school and some charitable institutions.

3. The county of Cornwall extends over the western part of the island, comprehending the plains of Pedro and Savanna la Mar, and the hilly country lying between them and north of them. The two most frequented harbours on the southern shores, Black River and Savanna la Mar, have little trade; but on the northern coast are three thriving towns, S. Lucia, Montego Bay, and Falmouth, each containing a population of between 5000 and 8000 inhabitants. Montego Bay is the chief town of the county, and the

assize courts are held here. The harbour is exposed to a heavy swell, which sets in during the prevalence of the north winds; but a breakwater has been erected as a protection against the sea. Fifty years ago Falmouth was an inconsiderable village, but it is now nearly as large and populous as Montego Bay, and carries on a considerable commerce.

The population of Jamaica appears to be less than 400,000 souls; but it cannot be exactly ascertained, as no complete census has ever been taken. In 1834 there were 297,186 negro slaves, all of whom have been made free in this present year (1838), by separate acts of the legislatures of Great Britain and of Jamaica.

The Maroons were originally runaway slaves, partly from Jamaica itself, partly from Cuba, who lived in the forests on the northern side of the island. In 1738 a tract of land was granted to them in those parts, which they cultivated and on which they built two small towns, and though a portion of them forfeited their privileges by a rebellion, others have preserved them to this day. The other inhabitants are either whites or people of colour. The whites are either natives of Great Britain or descendants of Europeans, and probably amount to about 30,000 individuals. The people of colour, of whom there are perhaps 40,000, are the offspring of Europeans and negro women. They are subdivided into *mulattoes*, the offspring of a white and a black; *samboes*, the offspring of a black and a mulatto; *quadroons*, the offspring of a white and a mulatto; and *mestees*, the offspring of a white and a quadroon. No traces of the native population of the island existed when it was taken by the English from the Spaniards.

The people are occupied either in agriculture or in trade. The following tables show the share which every town has in the trade of the island, and the imports and exports, and their value in sterling money for the year 1834.

1. Number, Tonnage, and Crews of Vessels which entered into the Harbours of Jamaica in 1834.

Ports.	Great Britain.			British Colonies.			United States.			Foreign States.			Total.		
	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.
Kingston	109	30,437	..	81	10,480	..	82	13,754	..	145	13,991	..	417	68,662	3983
Antonio	8	2,318	118	3	337	20	1	109	7	..	..	..	12	2,764	145
Montego Bay	26	7,981	..	24	3,577	..	25	3,843	..	31	1,995	..	106	17,396	1039
Morant Bay	28	8,975	494	7	1,137	57	2	282	13	..	..	..	37	10,394	564
Annotto Bay	17	5,237	..	..	..	..	1	129	..	..	..	..	18	5,366	290
Maria	8	2,453	..	2	562	..	1	223	..	5	193	..	16	3,431	201
St. Ann's Bay	3	668	56	..	..	..	..	..	..	..	..	..	3	668	56
Black River	5	1,633	89	..	..	..	..	..	..	..	..	..	5	1,633	89
Falmouth	21	6,901	..	18	2,225	..	16	2,230	..	12	300	..	67	11,656	642
S. Lucia	11	4,341	..	..	..	..	4	647	..	..	..	..	15	4,988	253
Savanna la Mar	..	..	..	..	..	..	3	438	..	1	125	..	4	563	30
Total	236	70,944	..	135	18,318	..	135	21,655	..	194	16,604	..	700	127,521	7292

2. Number, Tonnage, and Crews of Vessels cleared at the Ports of Jamaica in 1834.

Ports.	Great Britain.			British Colonies.			United States.			Foreign States.			Total.		
	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.
Kingston	72	21,184	..	67	8,326	..	47	7,544	..	191	20,273	..	377	57,327	3360
Antonio	6	1,545	..	6	695	..	1	109	..	..	..	..	13	2,349	138
Montego Bay	31	9,500	..	21	2,714	..	20	2,785	..	36	3,057	..	108	18,056	1067
Morant Bay	21	6,379	..	4	489	..	1	98	..	1	380	..	27	7,346	391
Annotto Bay	17	5,237	..	..	..	..	1	129	..	..	..	..	18	5,366	290
Maria	19	5,534	769	..	..	..	..	..	..	..	..	..	19	5,534	769
St. Ann's Bay	10	2,357	..	..	..	..	2	221	..	3	59	..	15	2,637	162
Black River	27	7,806	..	1	104	..	..	..	..	..	..	..	28	7,910	431
Falmouth	33	10,462	..	16	1,618	..	13	1,825	..	12	399	..	74	14,304	780
S. Lucia	14	5,273	..	4	699	..	4	583	..	1	171	..	23	6,726	335
Savanna la Mar	8	2,737	..	5	717	..	3	477	..	..	..	..	16	3,931	242
Total	258	78,014	..	124	15,362	..	92	13,771	..	244	24,339	..	718	131,486	7965

The imports into Jamaica in the year 1834 amounted to 1,589,720*l*. Some of the largest articles in amount were apparel and slops, beef and pork, butter, grain and flour, cotton articles, salted fish, glass, hardware and cutlery, iron, wrought and unwrought, hats, leather, linen articles, soap, stationery of all sorts, wine, wood and lumber, and woollen articles. The value of books imported was only 3755*l*. The exports from Jamaica during the year 1834 amounted to 3,148,797*l*. The chief articles were arrowroot, coffee, colonial and foreign cotton manufactures, dye and hard woods both of the growth of the island and imported, ginger, iron and steel manufactured articles, linens, molasses, pimento, sarsaparilla, spirits, rum and shrub, sugar colonial and foreign, tobacco unmanufactured, tortoiseshell, and woollens.

Towards the end of the last century and in the beginning of the present Jamaica was the entrepôt of the immense quantity of European merchandise which was destined for consumption on the Spanish Main and the Spanish islands, and though at present a free intercourse between these countries and Europe exists, yet a considerable quantity of British manufactures is still sent to Jamaica, and thence to Mexico, Central America, New Granada, and Venezuela. Dye and hard woods, indigo, and other articles are sent in return to Jamaica. The Americans of the United States also carry on a considerable trade with this colony, which they furnish with lumber and provisions, taking in return rum and molasses. But by far the most important commerce of Jamaica is that with the mother-country. The time when the ships arrive from Great Britain is from October to May, and they continue to depart as they get freighted, from April to the first day of August, after which day, and until the hurricane months are over, ships and their cargoes sailing for Great Britain pay double insurance.

Jamaica was discovered by Christopher Columbus on his second voyage, the 3rd of May, 1494, but was not settled by the Spaniards before 1510. In 1655 it was taken from the Spaniards by the English, who for some time did not ap-

preciate its value; at present it may be considered as the most important possession of any European nation in the West Indies. Since 1655 it has remained in the undisputed possession of the British, and its internal peace has only been disturbed by the rebellion of the Maroons in 1795. Though Jamaica has had an assembly since 1663, its present constitution was only completed in 1728. The executive is in the hands of the governor, who, as well as the council, consisting of twelve persons, is appointed by the king of Great Britain. The governor has the chief civil and military authority. The council constitutes the Upper House. The Lower House, or the Assembly, is composed of forty-five members, chosen by the freeholders, two from each of the 21 parishes; Spanish Town, Kingston, and Port Royal send one member each.

There is a Bishop of Jamaica whose see comprises the Bahamas and Honduras. Besides the clergy of the Established church, who have the care of the several parishes, there are Scotch, Presbyterian, Wesleyan, Baptist, and Moravian ministers.

Education is in a low state in the island. Most of the opulent persons send their children to England to be educated. According to an official Report presented to the British Parliament in 1834, the total number of children in the schools was 2019; of whom 133 were whites, 1365 were free persons of colour, and 521 slaves. Out of this number of 2019, only 1035 were taught writing and arithmetic in addition to reading and scriptural instruction. It must be observed however that this Report cannot be implicitly depended upon, and is also defective. The Report only comprises 12 parishes out of the 21; and does not include either Kingston or Spanish Town.

(Bryan Edwards, *History of the West Indies;* Stewart's *Past and Present State of Jamaica; Jamaica as it was, as it is, and as it may be;* De la Beche, in the *Geological Transactions,* 2nd series, vol. ii.; *Tables published by the Board of Trade.*)

JAMES, SAINT, THE EPISTLE OF, one of the books of the New Testament. There are at least two individuals of the name of James mentioned in the New Testament.

1. *James*, one of the Apostles, son of Zebedee, and brother of the apostle John (*Matt.* iv. 21; x. 29; *Mark,* i. 19, 29; iii. 17; x. 35; xiii. 3; *Luke,* v. 10; vi. 14; ix. 54; *Acts,* i. 13), who was chosen with Peter and John to accompany Christ to the Mount of Transfiguration (*Luke,* viii. 51; *Matt.* xvii. 1). He was beheaded at Jerusalem by order of Herod Agrippa about A. D. 44 (*Acts,* xii. 1, 2). He could not have been the author of the epistle; since it bears marks of having been written at a later period.

2. *James* 'the Less' as he is called in *Mark,* xv. 40, the son of Alphæus and Mary (*Matt.* x. 3; xxvii. 56; *Mark,* xv. 40) was also one of the apostles (*Matt.* x. 3; *Mark,* iii. 18; *Luke,* vi. 15; *Acts,* i. 13).

There is also mentioned in the New Testament a James, a brother of Jesus (*Matt.* xiii. 55; *Mark,* vi. 3); who according to Josephus (*Antiq.,* xx. 9, § 1) was put to death by the high-priest Ananias about A. D. 62 or 63. He was probably the same individual as the James who appears to have had the greatest influence in the church at Jerusalem (*Acts,* xv. 13; xxi. 18; *Gal.* ii. 12); and who, according to ecclesiastical tradition, was the first bishop of that church. Since James is also mentioned by St. Paul (*Gal.* i. 19) as one of the apostles, and as the Lord's brother, we meet with three individuals of the name of James who are said to be apostles; which is contrary to the lists of the apostles given in the Gospels. It was therefore supposed by the fathers, and has also been maintained by most modern divines, that James the son of Alphæus was the same person as James the brother of our Lord; and that the Greek word (ἀδελφός), which is translated 'brother' in our version, is used, like the Hebrew אָח, in the sense of 'cousin.' The epistle is almost universally attributed to this James by the Fathers and modern critics; it was probably written shortly before his death.

The Epistle is addressed to all the Jewish Christians 'which are scattered abroad' (i. 1); and its principal object is to exhort them to perseverance; to inculcate several moral lessons of great importance, and especially to explain the doctrine of justification by faith, which many persons appear to have misunderstood.

The canonical authority of this Epistle has been much disputed. Clement of Rome (1 *Corinth,* x) and Irenæus (*Hæres.,* iv. 16, § 2) had probably read it, but they do not quote it as of inspired authority. Eusebius places it among the *antilegomenai,* that is, writings which were not generally received, and also mentions several doubts which were entertained against it. Origen speaks of it as the Epistle said to be written by St. James. After this period it was generally received by the church, till the time of the Reformation, when its canonical authority was rejected by Luther and several other reformers on account of the difference, real or supposed, which was thought to subsist between the writings of St. Paul and those of St. James, in reference to the doctrine of justification by faith. The principal argument in favour of the canonical authority of this Epistle is in its forming part of the Peshito, that is, the Syriac version of the New Testament, which was made at the latter end of the first or the beginning of the second century of the Christian æra.

(The Introductions of Eichhorn, De Wette, Hug, Michaelis, and Horne; Herder, *Briefe zweener Brüder Jesu,* 1775; and the Commentaries of Schulthessius (1828), Gebser (1828), Schneckenburger (1832), and Theile (1833).

JAMES I., King of Scotland, was a younger son of King Robert III., who, hearing of the licentious conduct of his other son, David prince of Scotland, directed Robert duke of Albany, the boy's uncle, to seize him and keep him a prisoner till he promised amendment. This foolish order was readily obeyed by Albany, who wished nothing better than an opportunity to usurp the throne; and in a short time the prince died of dysentery, as it was said, but in truth of hunger in confinement. The king now began to fear Albany; and accordingly had his remaining son James secretly put on board a vessel for France. He did not escape however; for when but a short way on her voyage the vessel was taken by an English ship of war, and the prince carried prisoner to London. His weak old father was so affected by the news that in a few hours after he died of a broken heart. The duke of Albany was thereupon made Regent of the kingdom.

James, now in the 13th year of his age, was on the 14th April, 1405, conducted to the Tower, where he was detained till the 10th June, 1407, when he was removed to the castle of Nottingham. He was carried back to the Tower again on the 1st March, 1414, but a few months afterwards he was taken to Windsor, where he remained till the summer of 1417, when King Henry V. took him with him on his second expedition to France. The Duke of Albany died in 1419, and from that time measures began seriously to be taken for his release. During all this period James was receiving the best education which could be procured. He became familiar with sights of regal pomp and power, and with the manners and customs of the English court, at a time when there was much to interest and captivate the youthful mind: his habits were active, his conduct prompt and resolute, and at his return to his native kingdom he was in the spring and vigour of his life. He was long afterwards remembered in Italy as the inventor of a plaintive sort of melody, which had been admired and imitated in that country: he was one of the best harpers of his time, and excelled all the Irish and Scotch highlanders in their use of that instrument; and in the three pieces of his which have come down to our day—*Christ's Kirk on the Green, the King's Quhair* (or Book), and *Peebles at the Play*—we have no mean specimens of intellectual power and literary skill.

At his accession, in 1424, Scotland was in many respects a perfect contrast to England: it was in fact rather an aggregate of rival powers than a settled and united kingdom. There were still two Justiciars of co-ordinate authority, one on the north and the other on the south of the Forth; and in the former portion of the realm, which alone was properly denominated *Scotland,* and where the seat of authority still principally lay, there were numerous and powerful clans. The regencies, in the absence of James, had contributed to the national disorder—the two Albanies sacrificing to their own ambitious projects the just authority of government and the supremacy of the law.

James entered on the administration of his kingdom with a spirit and energy suitable to the high notions of prerogative which he had imbibed. Immediately on his arrival he proceeded against the family and adherents of the late regents, and eventually had several of them condemned and forfeited. All the customs of the realm, great and small, were annexed to the crown; and every valuable mine of

gold or silver. A new coinage was struck, of like weight and fineness with the money of England; hospitals were to be visited and reformed; idleness and begging were forbidden; the law records of the kingdom (which seem to have been in a state of neglect) were to be inspected and ascertained; and the statutes of parliament were ordered, for the first time, to be regularly enrolled. This was not all however; for in the spirit of King Henry IV.'s time, which had witnessed some detestable examples of religious persecution, an act was passed *anent heretics*, that inquisition be taken by every bishop in his diocese, and, 'gif it misteris,' that secular power be called in support and aid of the church. In his time the chancellor and clergy first got a footing in the administration of the common law. This was in the year 1425, when the chancellor and certain persons of the three estates chosen by the king were empowered, under the name of the Court of Session, to hear and finally determine all complaints, causes, and quarrels competent before the king and his council.

We have already alluded to the king's conduct towards the family and friends of the regent Duke of Albany immediately on his accession to the throne. At a later period of his reign we have another signal instance of the king's energy and promptitude of purpose in his conduct toward the Lord of the Isles. About the year 1427 the Lord of Isla was slain by a person of the name of Campbell, who had, it seems, a commission from the king to apprehend Isla; but, it is added, he exceeded his powers in putting that chieftain to death. The circumstance occasioned great disturbance throughout the highlands and isles. Determined to restore order, and to enforce the laws in those wild districts, the king summoned a parliament at Inverness, to which the Lord of the Isles and the other highland chiefs were cited to appear. On their arrival, to the number of about forty, they were seized by a stratagem of the king, and committed to prison in separate apartments. The Lord of the Isles and some others were at length liberated; but deeply feeling the indignity he had suffered, the Lord of the Isles, immediately on his return home, gathered together his friends and vassals, and at the head of a vast force wasted all the crown lands near Inverness, and made an attempt also to destroy the town. Information of this inroad being communicated to the king, orders were instantly given to repair to the spot; and leading his troops in person, he succeeded by forced marches in coming up with the rebels in Lochaber, at a time when they least expected such a thing. The consequence was that at length the rebels made an unconditional surrender, and the Lord of the Isles was obliged to make his submission on his bended knees at the court of Holyrood House.

The king's vigour and determination were not a little obnoxious to the nobles, who saw in it the speedy ruin of their usurped authority. But it is probable that his devotion to the ecclesiastics wounded them more keenly than all the exercise of his royal power. They felt humbled, not so much before the sovereign as before the clergy. A conspiracy was accordingly formed against him, under the Duke of Athol, the king's uncle, and on the 21st February, 1437, the king was murdered, in the 44th year of his age. A year or two afterwards also his advisor Wardlaw, bishop of St. Andrew's, died; and immediately on this event Bishop Cameron, Wardlaw's favourite, was turned out of the chancellorship which he had held from the institution of the Court of the Session, and Sir William Crichton, a layman, and the first who had held the great seal for a long period, was constituted chancellor; the Court of Session expired, and the course of the old common law was re-established.

JAMES II., King of Scotland, only son of James I., succeeded to the crown when but about seven years old. The rivalry which existed between the nobles and ecclesiastics at his father's death continued; and the one party or the other prevailed according as by violence or stratagem they obtained possession of the king's person. Disorder naturally spread throughout the kingdom, and the power of individuals grew most insolent from neglect to enforce the laws. The Earl of Douglas in particular erected a sort of independent principality in the country, and forbidding his vassals and dependents to acknowledge any authority save his own, he created knights, appointed a privy-council, named officers, civil and military, and appeared in public with a splendour and magnificence more than royal. To add to the calamities which the nation suffered, the country was visited by a plague, and there was also a great famine. The king was immature in mind as in years, and altogether deficient in the vigour necessary in his circumstances and situation: his partialities were also misplaced. During his whole reign the country was disturbed by intestine broils, and though continual executions and forfeitures took place yet no regular or effectual measure was adopted to obtain or secure peace. He was also attacked from England, and at the siege of Roxburgh, which was occupied by the English, he was killed by the bursting of a cannon near him. This was in the year 1460, and in the 29th year of the king's age.

JAMES III., King of Scotland, was, like his father James II., about seven years old at his accession to the throne, 3rd August, 1460. He had scarcely begun his reign when Donald, the Lord of the Isles, seeing the weakness of government and the distracted state of the kingdom, assembled a council of his friends and vassals at his castle of Ardtornish, and in the style of an independent prince granted a commission to ambassadors to confer with deputies from Edward IV., king of England, with a view to the settlement of the realm. The commissioners met at Westminster, and after a negotiation, concluded a treaty, dated at London, 13th February, 1462, the object of which was no less than the conquest of Scotland by the vassals of the chieftain and the auxiliaries to be furnished by Edward, with such assistance as could be given by the banished earl of Douglas. While this rebellion was going on in the north, Robert lord Boyd, one of the lords of the regency, and also lord-justiciar south of the Forth, and lord-chamberlain of the kingdom, was grasping in another part of the country at all the chief honours and places of government, and it would seem that the minor offices of magistrates and common-councilmen in the several burghs were also then objects of tumultuous contest; for it was at this time the act 1469, c. 29, was passed, by which the entire system of burgh election was changed, on the pretence of such confusion. This act was the foundation of the *close system*, which was only remedied by the late Burgh Reform Act for Scotland. The same year the act 1469, c. 30, was passed, subjecting all notaries to the examination and authority of the Ordinary. This act was passed to please the clergy, who had the ear of the king. The latter indeed appears to have been the known slave of his ecclesiastics; and Sir James Balfour (*Annals of Scotland*, an. 1481), records a trick played off upon him by King Edward IV. of England, who trimmed up a person in the habit of a papal legate, and sent him to James with injunctions and excommunications in the name of his Holiness. The imposition succeeded completely. The king took up also with low favourites, and on their account involved himself in a quarrel with his nobles, which ended in the encounter at Bannockburn. The king fled in fright from the field, and falling from his horse was *harled* into a miller's cottage, where, on being discovered, he was secretly killed and carried off, nobody knew where (Pitscottie, 220). The king's death took place in June, 1488, in the 35th year of his age.

JAMES IV., King of Scotland, son of James III., was about fifteen years old at his accession to the throne, which took place on the 11th June, 1488. He was of an active disposition, full of life and vigour; and in his time the commerce and literature of the country flourished under his encouragement. But though he possessed not a few of the elements of a great mind, he unfortunately became the slave of superstition, and thence in his public conduct a meer tool in the hands of his clergy.

In 1494, having fallen into a state of melancholy on the reflection that he had countenanced the rebellion in which his father perished, he received a legate from the pope, and, in obedience to him, bound about his waist an *iron belt*, to be worn in penance, day and night, for the remainder of his life. Sometime after this his queen fell sick, and immediately thereupon he made a pilgrimage to St. Ninian's in Galloway, on foot, for her recovery, and she having afterwards recovered, they both went thither in pilgrimage the same year. That year also he went to St. Duthin's in Ross —which was to the extreme north of the kingdom, as the other shrine was at the extreme south; and we cannot hesitate to think it was at the desire of the ecclesiastics that he made those repeated progresses to the highlands and isles in which we find him engaged, with the ostensible purpose of quieting that part of the realm, but in fact to remove him from the seat of authority and government. In the meantime the clergy were not idle. In the above year, 1494, the

university of Aberdeen (the third of the Scottish universities) was founded; and in the same year an act was passed in parliament, enjoining all barons and freeholders of substance to put their eldest sons to grammar learning, and thereafter for three years to the universities to study the canon and civil laws. In 1503, while the archbishop of St. Andrew's was lord chancellor, the court of *Daily Council* was instituted—a court of the same nature and extensive jurisdiction as the previous Court of the Session, composed of the chancellor and others appointed by the crown; and the same year an act was passed subjecting all notaries to the examination of the Ordinary. In 1512 a great council of the clergy was held at Edinburgh, where the famous *Valor beneficiorum*, called 'Bagimont's Roll,' was made up. The following year the king, taking up the French cause, entered, with the flower of the kingdom, on the fatal field of Flodden, where he perished. [HENRY VIII., p. 132.]

JAMES V., King of Scotland, son of James IV., was little more than a year old when the crown devolved upon him. But so equally poised was the balance of power in Europe at this time, that as the favour of Henry VIII. of England was anxiously sought by the rival monarchs of Germany and France, so all three courted the favour of James's government. The state of the papal see was also peculiar at this time; for besides the risks which it ran from the collision of temporal interests, it was now raising up for itself determined enemies within its own dominions. The reforming spirit of Martin Luther and his followers spread into Scotland, and introduced new elements of discord into a country then in a singularly distracted state. The regency of the young king was long an object of ambition; and in the struggle every thing was forgotten by the contending parties but success. The king was besieged, captured, and re-taken; and personal rencountres between nobles and their vassals in the streets of the metropolis were of frequent occurrence. The loss of laymen however at Flodden had given a decided advantage to the clergy, and the ecclesiastical interest at last bore undisputed sway. Gavin Dunbar, who had been the king's preceptor, was made archbishop of Glasgow in 1524; in 1528 he was appointed lord chancellor; and in four years afterwards the Court of Session was erected—a court of general and supreme jurisdiction under the chancellor. The latter was now at the head both of the church and common law; and when Cardinal Beaton became chancellor, his vast powers were exercised with such force and rapidity as threatened and well nigh accomplished the extermination of every power in the kingdom but his own and the papal. It was a matter of course that all attempts at an alliance with the king by King Henry VIII., who had become embroiled with the papacy, should be rejected. A war was thus provoked, and James was obliged to court those nobles whom it had been the policy of his court to humble. They now determined on a disgraceful revenge. In an attack on the Scottish border the English were repelled, and an opportunity offered to the Scots of cutting off their retreat. The king accordingly gave orders to that end, but his barons obstinately refused to advance; and in a subsequent engagement 10,000 of the Scots deliberately surrendered themselves prisoners to the enemy. The spirit of James sunk under his contending passions, and he died of a broken heart, in the 33rd year of his age.

JAMES I. of England, and VI. of Scotland, was the only offspring of Mary queen of Scots by her second husband Henry Stuart, lord Darnley, who, through his father Matthew Stuart, earl of Lennox, being descended from a daughter of James II., had some pretensions to the succession of the Scottish throne in case of Mary dying without issue, and who was the grandson, as Mary was the granddaughter, of Margaret Tudor, through whom the Scottish line claimed and eventually obtained the inheritance of the crown of England after the failure of the descendants of Henry VIII. The son of Mary and Darnley (or king Henry, as he was called after his marriage), was born in the castle of Edinburgh, 19th June, 1566, and was baptized according to the Catholic ritual in Stirling Castle, on the 17th of December following, by the names of Charles James. The murder of Darnley took place on the 18th of February, 1567; and was followed by Mary's marriage with Bothwell, 15th May of the same year; her capture by the insurgent nobles, or lords of the congregation as they called themselves, at Carberry, 14th June; her consignment as a prisoner to the castle of Lochleven, on the 17th; and her forced resignation of the crown, on the 24th of July, in favour of her son, who was crowned at Stirling on the 29th as James VI., being then an infant of little more than a year old.

The circumstances of the time, which was that of the final struggle in Scotland between the two great interests of the old and the new religion, which besides their intrinsic importance were respectively identified with the French and the English alliance, and also with the old and the new distribution of the property of the kingdom, made the minority of James stormy beyond even the ordinary use and wont of Scottish minorities. Before his mother's marriage with Bothwell he had been committed by her to the care of the earl of Mar, a nobleman of the most estimable character, who had retired with his charge to Stirling Castle, and there resolutely withstood all Bothwell's attempts to obtain possession of the infant prince. Here he continued to reside during the regencies of the earl of Murray (22nd August, 1567—23rd January, 1570), of the earl of Lennox (27th January, 1570—4th September, 1570), of the earl of Mar (6th September, 1570—29th October, 1572), and of the earl of Morton (24th November, 1572—10th March, 1578), his education being placed under the general direction of Mar's brother, Alexander Erskine, under whom were employed George Buchanan and three others of the most distinguished among the Scottish scholars. After his brother's death not only the custody of the king's person, but also the command of the castle, were left in the hands of Erskine, and principally by his management, in concert with the earls of Argyle and Athol, a plot was arranged in the beginning of the year 1578, the result of which was that at a council composed of nearly all the nobility of the kingdom, which met at Stirling, James, young as he still was, was requested to take the government into his own hands, and Morton was compelled to resign the regency at Edinburgh on the 10th of March, to the great joy of the nation, with whom the severity and rapacity of his administration had made him universally odious. Affairs were now nominally administered by the king, assisted by a council composed of twelve of the nobility. The new government however soon became unpopular, principally from the presumed or notorious inclination of its leading members in favour of popery; and this state of things in a few weeks opened a way for Morton to the resumption of nearly all his former authority. Into the hands of this man, undoubtedly one of the chief actors in the tragedy of his father's murder, the young prince now fell; and Morton succeeded in retaining his prize, notwithstanding all the efforts of the opposite party, till, partly by force, partly by skilful negotiation, he had apparently re-established his power on a foundation of complete security. It was not long however in being undermined, chiefly by the intrigues of two individuals, who seem to have first made their appearance at the Scottish court in the latter part of the year 1579, and immediately became the objects of the unbounded fondness of the young king. One of these earliest of James's succession of favourites was Esmé Stuart, a son of a younger brother of the earl of Lennox, and therefore a near relation of his own: he was a native of France, and bore in that country the title of Lord D'Aubigny, to which James rapidly added the Scottish honours of Lord Aberbrothock, earl of Lennox, and then duke of Lennox, with the appointments of governor of Dumbarton Castle, captain of the royal guard, first lord of the bedchamber, and lord high chamberlain. The other, a much darker character, was a Captain James Stuart, the second son of Lord Ochiltree. On the 30th of December, 1580, the mind of the king having been previously prepared for what was to be done, Captain Stuart entered the council chamber, and formally accused Morton of having been accessory to the murder of the late king Henry. The earl was immediately committed to prison, and notwithstanding the most strenuous efforts in his behalf by the English queen, he was brought to trial before the court of justiciary, condemned, and executed at Edinburgh, 2nd June, 1581. The two favourites, Lennox, and Stuart, recently created earl of Arran, were now the rulers of the kingdom, and they exercised their uncontrolled power with unmeasurable insolence. At length a party of the nobles, including the earls of Mar, Glencairn, and Gowrie, lords Lindsay, Boyd, and others, concerted a scheme for seizing the king's person, which they carried into effect, 12th August, 1582, at Gowrie's Castle of Ruthven, in Perthshire, whence the enterprise is known in Scottish history by the name of the Raid of Ruthven. On this revolution Arran was thrown into confinement, Lennox was ordered to leave

the kingdom, and soon after died in France, and James himself remained a captive in the hands of the conspirators, whose proceedings immediately received the full approval of a convention of the estates. They had also the active though unavowed support of Queen Elizabeth, who in the overthrow of the government of Morton and the ascendancy of Lennox and Arran had seen her whole policy with regard to the northern kingdom thwarted. On the other hand Henry III. of France interposed his influence, though unsuccessfully, to rescue the Scottish king from the thraldom in which he was now kept.

James remained in a state of restraint amounting almost to actual imprisonment for about ten months. At last, on the 27th of June, 1583, having been permitted to go from Falkland to St. Andrew's, he contrived, with the assistance of some friends, with whom he had arranged his plans, to throw himself into the castle there, and to maintain his position till the faction of his enemies, finding themselves outnumbered by those who flocked from all parts to his assistance, threw down their arms and gave up the contest. One of the king's first acts after he recovered his liberty was to release and recal to court the infamous Arran, and again to commit the management of affairs to that luckless minion, whose government speedily became as harsh and arbitrary as ever. James in the first instance had evinced a disposition to follow a moderate and conciliatory course with the faction lately at the head of affairs; he had even visited the earl of Gowrie at Ruthven Castle and granted him a full pardon; but under the influence of Arran he soon changed his conduct. An act was obtained from the convention of estates declaring all those who had been concerned in the Raid of Ruthven guilty of high treason: most of them made their escape to England; but Gowrie, who relying on his pardon had made his submission, was seized, thrown into prison, tried, condemned, and sent to the block. Seeing the power of that party thus to all appearance broken for ever, Elizabeth now applied herself to form an alliance with Arran, who readily undertook that the government of Scotland should be conducted in conformity with the wishes of the English queen, and by his unbounded influence over his royal master was easily able to perform that engagement. James was induced, among other acts of subserviency, to write to his mother in such undutiful and unfeeling terms as to make Mary, in the bitterness of her resentment, threaten to leave him the load of a parent's curse. Soon after this, 29th July, 1585, a treaty of intimate alliance was concluded between Elizabeth and the Scottish king, and an annual pension of 5000*l.* was settled by the former upon the latter. A chief manager in these transactions had been a new court favourite of James's, the eldest son of the Lord Gray, styled the Master of Gray, an individual formed by nature and education for intrigue and treachery. With the view, it is supposed, of removing a formidable rival, Arran had caused Gray to be sent as ambassador to the English court, where the unprincipled politician appears to have been immediately gained over by Elizabeth, and engaged by her to act his part in forwarding her various schemes of policy with regard to Scottish affairs. One of the first uses which Elizabeth made of this new instrument was to effect the overthrow of Arran, on whose unsteadiness and caprice she felt that she never could place any sure reliance. With her connivance, the lords who had been banished on account of the Raid of Ruthven entered Scotland at the head of a force of 10,000 men, in the end of October, 1585, and advancing to Stirling, where the king and Arran were, invested the castle, on which Arran took to flight, and the king was compelled to negotiate with them upon their own terms. All their past offences were pardoned; the principal forts of the kingdom were put into their hands; and, a parliament having been called, Arran and his late associates were all dismissed from power, he himself being besides stripped of his titles and estates—the latter, chiefly the confiscated property of those whose moment of retaliation was now come. The new settlement of the government was followed by the conclusion, 8th July, 1586, of another treaty with England, by which the two kingdoms bound themselves in a league offensive and defensive against all foreign powers who should invade the territories or attempt to disturb the reformed religious establishment of either.

In October of the same year James's mother, the unfortunate Mary, after her imprisonment of nearly twenty years, was at last brought to trial, and on the 8th of February following she was put to death. Between her condemnation and her execution James had made considerable exertions to save her; in addition to solicitations and remonstrances, he took steps to obtain the aid of France, Spain, and other foreign courts in support of his demands; but his ambassador to the English court, the infamous Master of Gray, is said to have betrayed his trust, so far as actually to be the most urgent instigator of the execution, often reminding Elizabeth and her ministers that the dead cannot bite, and undertaking that no unpleasant consequences should follow from any momentary resentment which James might show. In point of fact, the Scottish king was very soon pacified; he blustered at first under the sting of the insult that had been offered him; but reflecting that by any violent course he should put in hazard both his pension and his chance of the English succession, he prudently allowed himself to be soothed by Elizabeth's hollow excuses, and continued on the same terms of friendship with her as before. Gray was indeed, on the discovery of the part he had acted, disgraced and dismissed from court. The next year James signalized his zeal in the service of his English patroness by firmly rejecting all the overtures of the king of Spain and the other Catholic powers to induce him to join them, and by co-operating zealously with Elizabeth in her preparations for repelling the attack of the Armada.

In 1589, James was married to the princess Anne, the second daughter of Frederick II., king of Denmark. He proceeded in person to Upslo in Norway, to which place his bride, after having put to sea, had been driven back by a storm, and there the marriage was solemnized on the 24th of November. James did not return to Scotland till the 20th of May, 1590. The character of Queen Anne, who survived to 1st March, 1619, is depicted in the scandalous chronicles of the time in not very creditable colours; she is represented as an eager and restless intriguer, both in politics and in gallantry; on the other hand however, Archbishop Abbot, who knew her well, and who was not likely to regard with indulgence some of the faults she is charged with, speaks of her memory with great respect. She seems to have been a person of greater energy and decision than her husband, over whom she exerted considerable influence, notwithstanding his constant doting fondness for one male favourite after another. The first memorable event that occurred in Scotland after the king's return was a daring attempt made by his relation, Francis Stuart, lately created earl of Bothwell, a grandson of James V. by his son John, prior of Coldingham. He had been committed to prison on the absurd charge, made by some unhappy persons apprehended and tortured as witches, that he had employed their art to raise the storms by which the life of the queen had been endangered on her first attempted voyage to Scotland, and the king had afterwards been so long detained in Denmark. Upon effecting his enlargement, he collected a force of his retainers, and on the night of the 27th December, 1591, entered the palace of Holyrood-House, with the design, as he pretended, of expelling the chancellor Maitland from the king's council, but apparently with still more daring intentions. The alarm was given after he had set fire to several of the apartments and had nearly made his way to where the king was; he succeeded however in making his escape, and fled to the north. The earl of Huntly having been sent in pursuit of him, took that opportunity of falling upon his private enemy the young Earl of Murray (son-in-law and heir of the late regent), and slaying him, after burning his house to the ground; an atrocity which excited the deepest popular indignation at the time, and is celebrated in Scottish song. Bothwell and all his adherents were soon after attainted in parliament; but this did not put an end either to his audacious proceedings or to the treasonable attempts of other parties. In the beginning of 1593 a new conspiracy of Huntly and the other heads of the popish faction was detected for bringing a Spanish force into the kingdom, with the object of re-establishing popery and invading England; and a few months later, Bothwell, after having failed in another attempt to seize the royal person at Falkland, having associated himself with the remaining adherents or connexions of the late favourites Lennox and Arran, suddenly returned from England, where he had been protected by Elizabeth, and on the 24th of July, 1593, entered the palace with a band of armed followers, and made the king his prisoner. James was obliged both to grant a full pardon to the traitor and to

dismiss the chancellor Maitland and his other chief ministers; and he remained in durance till a convention of the nobles at last assembled at Stirling in the beginning of September, when his gaolers found it necessary to release him. Disturbances however were again and again excited in the course of this and the two following years by the attempts both of Bothwell and the popish lords; and at length these two factions, which had hitherto professed the most opposite principles, joining their forces, under the conduct of the earls of Huntly and Errol, encountered the royal army commanded by the young Earl of Argyle, at Glenlivat in Aberdeenshire, 3rd October, 1594, and, notwithstanding their inferiority in numbers, put it completely to the rout. This disaster however was immediately repaired by the results of an expedition conducted into the northern districts by James in person, who forced the popish lords first to retreat to the mountains, and eventually to make their submission, when they were allowed to retire beyond seas on giving security that they would engage in no further intrigues against the Protestant religion or the peace of the kingdom. Bothwell fled to France, and afterwards withdrew to Spain and Italy, where he professed himself a convert to popery, and spent the rest of his days in obscurity and indigence.

These commotions had scarcely been quieted when James became involved in new troubles in consequence of a contest into which he was brought with the clergy of the Presbyterian church, which had been legally established as the national form of religion by an act of the Scottish parliament in 1592. Although James had been induced by considerations of policy to give his assent at the moment to this popular act, he was himself an avowed admirer of episcopacy, and was even very generally suspected of a strong inclination towards popery; so that the alliance of Church and State in this case was one of a very frangible nature. To make matters worse, both parties cherished the loftiest notions of their powers and rights, each indeed looking upon itself as entitled to lord it over the other. In December, 1596, in a tumult of the people of Edinburgh, excited by the harangues of their clergy, the life of the king was placed in the greatest danger, and the decided measures that followed on both sides made the contest assume the appearance of the commencement of a civil war. Nearly all the aristocracy and the upper classes however were with the king; the clergy and the people in vain endeavoured to find one of the nobility who would espouse their cause and come forward as their leader; and by an unusual exertion of vigour and firmness James was enabled not only completely to crush the insurrection, but to turn the occasion to account in bringing the Church into full subjection to the civil authority. In the course of the following year, 1598, the substance of episcopacy, in a political sense, was restored by seats in parliament being given to about fifty ecclesiastics on the royal nomination. Even the General Assembly was gained over to acquiesce in this great constitutional change.

The most memorable event in the remainder of James's Scottish reign was the very mysterious affair known in history by the name of the Gowrie conspiracy. On the 5th of August, 1600, James, being then at Falkland, was induced by Alexander Ruthven, a younger son of the earl of Gowrie who was executed in 1584, to accompany him with a few attendants to the house of his brother the earl of Gowrie at Perth. Some time after his arrival he was led by Ruthven into a retired apartment of the house; there a struggle took place between the two, in the presence only of the earl's steward, who was in full armour, but either did not interfere at all, or, according to his own account, only for the king's protection. Meanwhile, what was going on was perceived from the street, on which the people assembled, and the king's attendants rushed to the room: in the end the king remained unhurt, but both Alexander Ruthven and his brother the earl were killed. These are nearly all the undoubted facts of this strange transaction: they seem to establish a design on the part of the Ruthvens to obtain possession of the king's person, and there are some circumstances leading to the conjecture that they were prompted by the English government. That they intended to take his life, as James endeavoured to make it appear, the whole circumstances of the case will scarcely allow us to suppose. The passage however is one of the darkest in history, and, after the expenditure of much ingenuity in the attempt to clear it up, it may be pronounced that no explanation of it which is satisfactory at all points has yet been given, or is likely ever to be attained. Whatever was the nature of the affair, it stands isolated from all the other events of the time, and had as little effect upon anything that came after it as it is known to have had of connection with anything that went before.

In the last years of his residence in Scotland James was much occupied in taking measures for securing his succession to the English throne, an object which, from the capricious temper of Elizabeth, and other circumstances of the case, remained of doubtful attainment up to the very moment of its accomplishment. Although no party to the rash attempt which cost the earl of Essex his life in 1601, he had been previously in correspondence with that nobleman, who seems to have led the Scottish king to believe that zeal for his cause was the motive of his conduct; and after receiving the news of the ill success of his friend, James appears to have been prepared to go all lengths to save him from the block, having even ordered the ambassadors, whom he despatched immediately to the English court, to follow up their entreaties and remonstrances, if necessary, with an open declaration of war. The head of Essex however had fallen before the Scottish ambassadors reached London. Eventually Sir Robert Cecil himself became James's chief confidant; but it is remarkable that even after he had thus secured the important services of the English prime minister, James continued to hold a clandestine correspondence on the same great subject of the succession with other parties, of whose participation in the business Cecil apparently was kept in entire ignorance. (See Lord Hailes's 'Remarks on the History of Scotland,' ch. xiv.) Many of Cecil's letters have been preserved, and were published at Edinburgh by Lord Hailes (Sir David Dalrymple) in 1766, under the title of 'The Secret Correspondence of Sir Robert Cecil with James VI., King of Scotland,' 12mo.

James at length became king of England by the death of Elizabeth, 24th March, 1603, when his accession took place without a murmur of opposition from any quarter. Having set out from Edinburgh on the 5th of April, he entered London on the 7th of May, after a journey which in both countries resembled a triumphal progress. Many of his Scottish courtiers accompanied their sovereign, and the prodigality with which he distributed the wealth and honours of the kingdom among these hungry northern adventurers was one of the first things in his conduct that disgusted his new subjects. In his foreign policy James began by continuing in the same course that had been pursued by Elizabeth, entering into a close alliance with Henry IV. of France for the support of the Dutch and resistance to the aggressions of Spain. The conspiracy of Sir Walter Raleigh, Lord Cobham, and others, to place on the throne the Lady Arabella Stuart, James's cousin, was the first domestic affair of interest. [RALEIGH, WALTER.] The next business that engaged James's attention was the settlement of the disputes between the Church and the Puritans, for which purpose a conference was held at Hampton Court, in January, 1604, and the points of difference discussed in the king's presence, he himself taking a conspicuous part in the debate. [CONFERENCE.] James's first parliament met on the 19th of March, and was opened by a speech which, as Hume remarks, 'proves him to have possessed more knowledge and greater parts than prudence or any just sense of decorum and propriety.' Among other things he zealously urged the union of England and Scotland into one kingdom; but nothing came of this proposal for the present. James however, of his own authority, now assumed on his coins and in his proclamations the title of King of Great Britain. [GREAT BRITAIN.]

Peace with Spain was concluded, much to the gratification of the king's wishes, on the 18th of August this year. The great event of the year 1605 was the Gunpowder Plot. [FAWKES, GUY; GARNET, HENRY.] For some years after this the history of the reign is marked by no memorable events either foreign or domestic; but, although James still continued to govern by parliaments, various causes were contributing gradually to alienate the House of Commons from the crown, and to prepare the elements of that open contest between the two powers which broke out in the next reign. In 1612, the death of James's eldest son, Henry prince of Wales, in the nineteenth year of his age, spread a general grief through the nation, to which the prince had already endeared himself by the promise of a character which may be most shortly described as being in almost all respects—in its defects as well as in its virtues—

the reverse of that of his contemptible father. A rumour arose at the time, and has been preserved by some contemporary writers of a violent party spirit, that the prince had been carried off by poison, and not without the privacy and consent of the king; but this accusation, too monstrous to be admitted without the strongest evidence, rests upon neither proof nor probability of any kind. The death of Prince Henry was followed, 14th February, 1613, by the marriage of James's daughter, the Princess Elizabeth, with Frederick the Elector Palatine, an alliance which was attended with important results both in that age and in the next.

The ruling favourite whom James had brought with him from Scotland was Sir George Hume—whom in 1604 he created Lord Hume in the English peerage, and in 1608 earl of Dunbar in that of Scotland—a man of integrity, as well as of superior talent. The king's silly and mutable fondness however was in course of time transferred to other objects—to Philip Herbert, the second son of the earl of Pembroke, whom he made earl of Montgomery in 1605, and who many years after succeeded his elder brother as earl of Pembroke; and to another Scotchman, Sir James Hay, made a Scottish peer by the title of Lord Hay of Bewlie in 1609, and who afterwards bore successively in the English peerage the titles of Lord Hay of Sawley (1615), Viscount Doncaster (1617), and earl of Carlisle (1622), by which last he is best remembered. It is said to have been Hay who, about the beginning of the year 1610, introduced at court a young countryman of his own, Robert Carr, or more properly Ker, of a good family, but chiefly distinguished by his handsome person, an advantage which never failed to attract the king's attention and regard. Carr was immediately taken into the highest favour, made a knight of the Bath, and the next year a peer by the title of Viscount Rochester. In 1613 the young and beautiful Frances Howard, countess of Essex, having by an infamous process, in urging which the king took a part that alone ought to consign his memory to abhorrence, obtained a divorce from her husband, was married to the favourite, her previous profligate passion for whom is believed to have incited her to the proceedings by which she succeeded in dissolving her first marriage. The king on this occasion raised Rochester to the rank of earl of Somerset (November, 1613). Somerset's fall however was still more rapid than his rise. His chief friend Sir Thomas Overbury, who had strenuously exerted his influence to prevent his marriage with Lady Essex, which he represented as the sure destruction of his fortunes, was first, by the contrivance of the unprincipled woman whom he had thus made his enemy, thrown into the Tower, and soon after taken off by poison administered to him by her means, and with the privity of her husband. The crime, though suspected from the first, was not fully discovered till about two years after its commission; but in 1615 all the parties concerned in it were brought to trial, and their guilt completely established. Four persons who had been accomplices in the murder were left to the executioner; the two principals, the wretched Somerset and his wife, had their better merited punishment commuted into confiscation of their property, and imprisonment, from which they were both after some years released. Their condemnation of course threw down the earl from his place and favour at court, and he was given up with the most easy indifference, not unaccompanied with some touches of gratuitous baseness, by James, whose mind had now been taken possession of by a passion for a new object, another handsome youth, named George Villiers, who had been recently introduced to his notice. Villiers, who, after having been knighted, was created successively Viscount Villiers (1616), earl of Buckingham (1617), marquis of Buckingham (1618), and duke of Buckingham (1623), continued the first favourite and ruling minister during the remainder of the reign. [BUCKINGHAM.]

In the summer of 1617 James paid a visit to Scotland, and, having summoned a parliament, succeeded, though not without great difficulty, in obtaining the assent of that body, and also of the General Assembly, to such regulations as, along with other innovations previously made since his accession to the English throne, brought the Scottish church, in government, in ceremonies, and in its position in relation to the civil power, very nearly to the model of the English. It was now no longer a Presbyterian, but nominally as well as substantially an Episcopal church. But the popular feeling of the country was never for a moment reconciled to these enforced changes.

The year 1618 was disgraced by the execution of Sir Walter Raleigh, on the monstrous pretence of the sentence passed upon him for the conspiracy in which he had been involved in the first year of the king's reign, but in reality as a sacrifice to the court of Spain. [RALEIGH.] But the public indignation at James's subserviency to that Catholic power was roused to a still higher pitch by the great foreign events of the two following years, when, Austria assisted by Spain having attacked the Bohemians, who had chosen the Elector Palatine for their king, James not only refused to take part with his son-in-law and the Protestant interest on the Continent, of which he was thus installed as the champion, but even refused to acknowledge his new regal title. Frederick was soon driven both from his acquired and his hereditary dominions by the arms of the Catholic powers confederated against him, and obliged with his family to take refuge in Holland. Staggered by this sudden catastrophe, and by the vehemence with which the people expressed their rage and grief, James now hastened to take some steps to repair the disasters which his pusillanimity and inaction had mainly occasioned. After endeavouring to raise money in the way of a benevolence, he found himself obliged to call together a parliament, the first that had been allowed to meet for six years. In this parliament, memorable among other things for the impeachment of Bacon [BACON, FRANCIS], the first decided stand was taken by the Commons in their contest with the crown by their famous protest, passed 18th December, 1621, in reply to the king's assertion that their privileges were derived from the grace and concession of his ancestors and himself,—'That the liberties, franchises, and jurisdiction of parliament are the antient and undoubted birthright and inheritance of the subjects of England.' This resolution, which the king tore from the Journals with his own hand, was followed by the immediate prorogation and soon after by the dissolution of the parliament; several of the leading members of the House of Commons being at the same time sent to the Tower or to other prisons.

James had for some time before this set his heart upon the marriage of his son Prince Charles with a Spanish princess: the project of that match had principally influenced him to the course he had taken in the affair of Bohemia, and he now hoped by the same arrangement to be able, without having recourse to arms, to recover the Palatinate for his son-in-law. But in both these expectations he was disappointed. For some time the negotiations seemed to proceed favourably; but they were in 1623 brought to an abrupt termination, apparently by the rash interference of Buckingham, who, after having persuaded Prince Charles to proceed along with him to Spain for the purpose of expediting the matter, disgusted and quarrelled with the leading personages of the Spanish court, and then successfully exerted his influence with James, or perhaps rather with the prince, to prevent the match. As the public clamour for the recovery of the Palatinate still continued, another parliament was assembled in February, 1624, which eagerly granted supplies for the attainment of that object by force of arms; war was in consequence declared against Spain, and an army under Count Mansfeldt was sent into Germany in the latter part of the year. But this expedition turned out an utter failure; the force, reduced to half its numbers by a pestilential disorder before it had crossed the sea, never even entered the Palatinate; and that principality remained in the hands of the Emperor, or rather of the Duke of Bavaria, to whom it had been assigned, along with the electoral dignity, by the Imperial diet.

James's reign of nearly fifty-eight years in Scotland, and rather more than twenty-two in England, was terminated by his death on the 27th of March, 1625, when he was within three months of completing the fifty-ninth year of his age. As happened in the case of the death of almost every person of eminence in that and the preceding age, a rumour sprung up that he had been carried off by poison; and when Buckingham was impeached by the Commons in the beginning of the next reign, one of the charges brought against him was that the late king owed his death to some plasters and drinks which he had administered to him without the knowledge of the physicians. In fact something of this kind does appear to have taken place, although Buckingham's intentions in what he did may possibly have been innocent enough. It was even said, in the violence of party hate, that Charles himself was implicated in the poisoning of his father; and this grossly improbable imputation has re-

ceived the eager sanction of Milton. The statements upon the subject are collected in Harris's 'Life of James I.,' pp. 281-288; and 'Life of Charles I.,' pp. 21-25 (edit. of 1814).

James's children by his queen, Anne of Denmark, born 12th December, 1574, married 24th November, 1589, died 2nd March, 1619, were: 1. Henry Frederick, born at Stirling Castle, 19th February, 1594, died 6th November, 1612; 2. Robert, died in infancy in Scotland; 3. Charles, who succeeded his father as king; 4. Elizabeth, born 19th August, 1596, married to Frederick V. Elector Palatine 14th February, 1613, died 8th February, 1662; 5. Margaret, born 24th December, 1598, died in infancy; 6. Mary, born 1605, died 16th December, 1607: and 7. Sophia, born 21st June, 1606, died two days after. The Electress Sophia, the mother of George I., was the youngest of the thirteen children of the Princess Elizabeth and her husband the Elector Palatine. [George I.]

Besides the well authenticated public acts of James I., many materials may be found for the illustration of his character in the works of various writers who were his contemporaries: especially Sir Anthony Weldon's 'Court and Character of King James,' 12mo., 1651; Arthur Wilson's 'Life and Reign of King James the First, King of Great Britain,' fol. 1653, or as reprinted in the second vol. of Bishop Kennet's 'Complete History;' Sir Edward Peyton's 'Divine Catastrophe of the Kingly Family of the House of Stuarts,' 8vo., 1731; 'The Non-such Charles, his Character,' 12mo, 1651 (supposed by some to be written by Peyton); Sir Ralph Winwood's 'Memorials of Affairs of State in the Reigns of Queen Elizabeth and King James I.' fol. 1725; Francis Osborne's 'Traditional Memoirs on the Reign of King James,' in Works, 8vo., 1673, &c.; and Roger Coke's 'Detection of the Court and State of England,' 2 vols. 8vo., 1697. See also 'Dr. James Welwood's 'Memoirs of the most material Transactions in England for the last Hundred Years preceding the Revolution,' 8vo., Lond. 1700, and Glasg. 1741. Although some of the above-named writers are avowedly very unfavourably disposed to the memory of this king, and relate scarcely anything of him that is not to his discredit, there is too much ground for believing that the most severe of them have scarcely exaggerated the more despicable features of his character. Even his better qualities leaned to the side of vice or weakness; his easiness of temper was but an indolent sensuality, and his pacific disposition and aversion to war mere pusillanimity and cowardice. Of dignity or elevation of mind he had no conception; his tastes, opinions, passions, and habits were all alike low and vulgar, if indeed for some of them these be not far too gentle epithets. With such a moral nature it was impossible that his intellect could be other than a stinted one; yet his education had given him a good deal of learning, at least for a king, and although he was far from being either the profound scholar, philosopher, or divine that he supposed himself, and that he was flattered with being by his contemporaries, who called him Solomon the Second, he was certainly not destitute of some literary talent, however dashed most of the exhibitions of it were with occasional grotesqueness and absurdity. He was a voluminous author, and any account of him would be very incomplete which did not notice his various printed works in prose and verse. They have been partially enumerated by Harris, in his 'Historical and Critical Life,' and by Horace Walpole, in his 'Royal and Noble Authors;' but the fullest account that we have met with is that given by Dr. David Irving, in his 'Lives of the Scottish Poets,' 2nd edition, 2 vols., Edinb. 1810, vol. ii., pp. 207-291. His first publication, a collection of poems, under the title of 'The Essays of a Prentice in the Divine Art of Poesy,' 4to, appeared so early as 1584. About the same time also he appears to have composed his 'Fruitful Meditation,' upon part of the Revelation of St. John, which however was not printed till 1588. Of his subsequent works the following are the chief:—'His Majesty's Poetical Exercises at Vacant Hours,' 1591; his 'Dæmonologie' (a dialogue, in three books, in defence of the belief in witches), 4to., 1597; 'The True Law of Free Monarchies, or the Reciprocity and Mutual Duty betwixt a free King and his Natural Subjects' (Anonymous), 1598; 'Βασιλικὸν Δῶρον, or his Majesty's Instructions to his dearest Son Henry the Prince,' 1599 (a treatise which, on account of the doctrines it contained on church government, was censured as libellous by the synod of St. Andrew's); 'A Discourse of the Unnatural and Vile (Gowrie) Conspiracy against his Majesty's Person,' 1600 (reprinted, with notes, by Lord Hailes, 1757, and along with his 'Annals,' 1819); 'Triplici Nodo Triplex Cuneus, or an Apology for the Oath of Allegiance,' 1605 (which was answered by Cardinal Bellarmin, and produced a long controversy, and many other publications on both sides, for an account of which see a note by Dr. Birch in the Appendix to Harris's Life); 'A Premonition to all Most Mighty Monarchies, &c.' 1608 (on the same subject); 'A Declaration (in French) concerning the Proceedings with the States-General of the United Provinces of the Low Countries, in the Cause of D Conradus Vorstius' (appointed Professor of Divinity at Leyden), 1612; and 'A Remonstrance for the Right of Kings (in French), in answer to Cardinal Perron,' 1615. A collected edition of all the preceding prose works, except the Discourse on the Gowrie Conspiracy, was published, in folio, in 1616, under the title of 'The Works of the Most High and Mighty Prince James, &c., by James (Mountague), Bishop of Winton.' The volume also contained some treatises that had not before appeared, particulary 'A Counterblast to Tobacco' (this however, according to Harris, was first printed in quarto, without name or date), and 'A Discourse of the Manner of the Discovery of the Powder Treason.' A Latin translation of this collection was published under the care of Bishop Mountague, in 1619. To the works already enumerated are to be added a number of speeches to parliament, some of which are not the least curious or characteristic of the royal author's compositions; various sonnets and other short pieces of verse, in English and Latin, scattered in different collections, printed and manuscript; and a metrical version of the Psalms, published at Oxford, 12mo., 1631, in which however, according to his funeral sermon, preached by Bishop Williams, he had only proceeded as far as the thirty-first Psalm at his death. It ought also not to be forgotten, that the authorized translation of the Bible was commenced and completed under his auspices. [Bible.]

Of the changes in the law introduced in this reign the most important were effected by certain acts of the parliament which met in February, 1623. By one of these (the statute 21 Jac. I., c. 2), entitled 'An Act for the General Quiet of the Subjects against all Pretences of Concealment (of Lands belonging to the Crown) whatever,' it was enacted that no person could in future be sued or impeached by the king for any manors, lands, revenues, &c., unless it might be proved that he or his progenitors had a title to them within sixty years before the meeting of that parliament. This was a very valuable modification of the old law maxim, *Nullum tempus occurrit regi*. By another of these acts (the statute 21 Jac. I., c. 3), entitled 'An Act concerning Monopolies and Dispensations with Penal Laws,' it was declared that all charters, licences, and letters patent granted to any person by the crown to dispense with any law or statute should be void, and that all licences and privileges for the sole buying, selling, or working of anything should be void, except patents for a term not exceeding fourteen years to the authors of new inventions, and a few other existing patents, which were specially enumerated. [Monopoly.] This abolition of the dispensing power, and of the power of granting unlimited monopolies, both of which had hitherto been considered to be vested in and had been extensively exercised by the crown, was the extinction of two great practical evils. Blackstone enumerates as the chief improvements made in the administration of private justice in this reign, the abolition of sanctuaries and the extension of the bankrupt laws, the limitation of suits and actions, and the regulating of informations upon penal statutes. To this short list, it has been observed, may be added 'the statutes for extending the benefit of clergy to women in certain offences, the restriction upon costs in certain frivolous actions, and the salutary assistance afforded to magistrates in their defence to actions brought against them for things done in the execution of their office.'—*Note by Mr. Justice Coleridge to Com. IV.*, 436.

JAMES II. of England, and VII. of Scotland, was the second surviving son of Charles I. by his queen Henrietta Maria of France, and was born at St. James's, 15th October, 1633. He was immediately declared duke of York, but not formally created to that dignity till 27th January, 1643. After the surrender of Oxford to Fairfax in June, 1646, the duke, with his younger brother Henry, afterwards created duke of Gloucester, and his sister Elizabeth, was committed by the parliament to the care of the earl of Northumberland, and he continued in the custody of that

nobleman till the 21st of April, 1648, when he made his escape from St. James's Palace, disguised in female attire, and took refuge in Holland with his sister Mary, princess of Orange. Here he immediately joined a part of the English fleet which had revolted from the parliament, and was then lying at Helvoetsluys; but although at first received on board as admiral, he soon after resigned that post to his brother, the prince of Wales, on the arrival of the latter from Paris, and returned to the Hague. When Charles, now styled king by his adherents, came to Jersey, in September, 1649, he was accompanied by the duke, who remained with him during his stay of three or four months. He then returned to the Continent, and resided for some time with his mother at Paris. 'Never little family,' says Clarendon, who had an interview with him at Breda in 1650, 'was torn into so many pieces and factions. The duke was very young, yet loved intrigues so well that he was too much inclined to hearken to any men who had the confidence to make bold propositions to him. The king had appointed him to remain with the queen, and to obey her in all things, religion only excepted. The Lord Byron was his governor, ordained to be so by his father, and very fit for that province, being a very fine gentleman, well bred both in France and Italy, and perfectly versed in both languages, of great courage and fidelity, and in all respects qualified for the trust; but his being absent in the king's service when the duke made his escape out of England, and Sir John Berkley being then put about him, all pains had been taken to lessen his esteem of the Lord Byron; and Sir John Berkley, knowing that he could no longer remain governor when the Lord Byron came thither, and hearing that he was on his journey, infused into the duke's mind that it was a great lessening of his dignity at that age (when he was not above fourteen years of age, and backward enough for that age) to be under a governor; and so, partly by disesteeming the person, and partly by reproaching the office, he grew less inclined to the person of that good lord than he should have been.' (*Life*, i. 284, edit. of 1827.) Shortly before his meeting with Clarendon it had been reported that Charles, then in Scotland, was dead; upon which the duke, looking upon himself as almost already king, had set his mother's authority at defiance, and left Paris for Brussels, with the view of taking counsel, as to what he ought to do, with the duke of Lorraine. When the falsehood of the intelligence about Charles was discovered, he and the advisers by whom he was attended resolved upon going to the Hague; 'and when they had wearied all people there,' says Clarendon, 'they came to Breda, where the chancellor had met them. The duke himself was so young that he was rather delighted with the journeys he had made than sensible that he had not entered upon them with reason enough; *and they had fortified him with a firm resolution never to acknowledge that he had committed any error.*' (*Ibid*, p. 290.) In the end he found himself obliged to return to his mother at Paris; and here he chiefly resided till he attained his twentieth year, when he received a command in the French army, and served for some time under Marshal Turenne. The peace concluded with Cromwell however in October, 1655, compelled him, with his elder brother, to quit France; upon which, on the invitation of Don John of Austria, the governor of the Low Countries, he retired thither, and entered the Spanish service. Both he and his brother the duke of Gloucester fought on the Spanish side at the siege of Dunkirk, which surrendered to the French in June, 1658.

At the Restoration (May, 1660) the duke of York returned to England with the king, and was immediately made lord-high-admiral and lord-warden of the Cinque Ports. The course of his conduct for the next twenty-five years forms an important part of the public history of his brother's reign, and only the leading incidents can be shortly noticed here. In September, 1660, he married Anne, the eldest daughter of the Chancellor Hyde (afterwards earl of Clarendon), to whom it was affirmed that he had been married, or at least contracted, at Breda about a year before. The lady was at any rate far gone with child when the present marriage took place, and produced a son in about six weeks, a circumstance which makes her father's professed ignorance and want of suspicion as to the whole affair the more extraordinary. For some curious details touching his behaviour when the matter was first communicated to him by the king, his 'Life,' written by himself, may be consulted. It is asserted by Burnet that the duke endeavoured to avoid the marriage, and that 'he thought to have shaken her from claiming it by great promises and as great threatenings; but she was a woman of great spirit, and would have it known that she was so, let him use her afterwards as he pleased.' This is altogether opposed to her father's account, according to whom the duke petitioned the king to give his consent to the marriage with a 'passion which was expressed in a very wonderful manner, and with many tears, protesting that if his majesty would not give his consent he would immediately leave the kingdom, and must spend his life in foreign parts.' But the delay of the step till so near the last moment does not look much like impatience on the duke's side, and rather gives ground for suspecting that there was some reluctance which it required great exertions to overcome.

The duke of York took an eager part in promoting the war with Holland, which broke out in the close of 1664, and as lord-high-admiral he assumed the command of the fleet which was fitted out, and which put to sea even before any declaration of hostilities. The motive that has been sometimes assigned for the conduct of both the brothers on this occasion is their wish to crush the Dutch as a Protestant people, and to disable them from interfering to prevent the re-establishment of popery in England. On the 3rd of June, 1665, the duke gained a great victory off Harwich over the Dutch fleet commanded by Admiral Opdam, who was killed, and nineteen of whose ships were taken or sunk, with the loss of only one on the part of the English. The death of the duchess of York took place in the thirty-fourth year of her age, on the 31st of March, 1671, hastened, as is supposed, by the neglect, if not the positive ill-usage, of her husband, who, notwithstanding his professions of zeal for religion, indulged himself in a fair share of the reigning licentiousness, and kept a mistress almost from the date of his marriage. A few months before her death the duchess had signed a declaration of her reconciliation to the antient religion; and immediately after that event the duke also publicly avowed his conversion to popery, an act which, although his concealed inclinations had been long suspected, did not fail to create a great sensation, especially as, from his brother's want of issue, he was now looked upon as Charles's probable successor on the throne.

When war was anew declared against Holland, in March, 1672, the Duke of York again took the chief command at sea. The most remarkable event of this contest was the action fought 28th May, 1672, in Solebay, off the coast of Suffolk, between the combined English and French fleets under the duke and Count D'Estrées, and the Dutch fleet commanded by De Ruyter, who attacked the allies with a very inferior force, and was not driven off till the engagement had lasted the whole day, and the English fleet had been so shattered as to be disabled from pursuing him. The French are accused of having taken little part in the affair; the object of their government, it is conjectured, having been to allow the English and Dutch to destroy each other. On the passing, in the beginning of the following year, of the Test Act, which required all officers, civil and military, to receive the sacrament according to the usage of the Established Church, the duke necessarily resigned both the command of the fleet, in which he was succeeded by Prince Rupert, and the office of lord-high-admiral, which however was assigned to a board of commissioners consisting of his friends and dependants, so that he still remained substantially at the head of the naval affairs of the country. On the 21st of November, 1673, he married Mary Beatrix Eleanora, daughter of Alphonso IV., duke of Modena, a lady then only in her fifteenth year. Before concluding this union he had paid his addresses to Susan, Lady Belasye, daughter of Sir William Armine, Bart, and widow of Sir William Belasye, the son of Lord Belasye; but that affair was broken off, partly by the obstinate Protestantism of the lady, partly by the interference of her father, who gave the king information of what was projected, when Charles sent for his brother and told him that having played the fool in making an unequal marriage once already, he ought to be satisfied without repeating the same thing in his advanced age. The lady was induced, partly by promises, partly by threats, to relinquish the claim she had, founded upon a written promise of marriage, and by way of compensation was, 25th March, 1674, created Baroness Belasye for life. She survived till 1713. On the 4th of November, 1677, the Duke's daughter Mary, then in her sixteenth year, was, greatly to the public satisfaction, mar-

ried to her cousin William, prince of Orange, the consent of her father having been obtained to this Protestant alliance by the persuasions of the king, his brother, who represented to him how much he might soften the popular hostility to him on account of his religion by so apparently strong an evidence of his liberality.

During the excitement produced by Titus Oates's Popish Plot, in 1678-9, the Duke of York by the advice of his brother retired to the Continent, and he resided at Brussels with his wife and his youngest daughter for five or six months. While he was absent the famous bill for his exclusion from the throne was twice read in the Commons, and ordered to be committed, by large majorities, and was only prevented from being passed in that house by the prorogation of the parliament, 27th May, 1679. To this date may be assigned the commencement of the open rivalry between the Duke of York and Charles's natural son the Duke of Monmouth, whose popularity with the nation, still more than the presumed partiality of his father, undoubtedly made him a somewhat formidable competitor for the succession, in the actual circumstances of the legitimate heir. For the present however the latter succeeded in maintaining the ascendency. Returning home in the beginning of September he had the satisfaction of seeing Monmouth removed from his post of captain-general and exiled, while he obtained from the king for himself the government of Scotland. Before he set out for that country however he became involved with other persons of his religion in the discredit of giving countenance to the story of the Meal Tub Plot, which the Catholics got up with the hope, in which they were grieviously disappointed, of counteracting the effects of Oates's pretended discoveries. The share which the Duke had in this business only added to the dislike in which he was held by the great body of the nation, and which was still further increased by the bigoted severity of his administration of affairs in Scotland. In November, 1780, a new exclusion bill was brought into the House of Commons, but although it was carried through all its stages in that House by great majorities, it was thrown out in the lords. The bill was again introduced in the Lower House in the following January; but the prorogation of the parliament on the 10th of that month, and its dissolution a few days after, prevented the business being proceeded with. A new parliament having met at Oxford in March, the bill was again brought forward there, and again defeated by the same expedient, this the last parliament held by Charles II. having been dissolved after it had sat only seven days.

A visit which the Duke of York paid to London in March, 1682, is memorable on account of a disaster which happened to the ship in which he sailed on his return to the north in May; it struck upon a sand-bank near the mouth of the Humber, when the Duke and a few of his attendants, among whom was Mr. Churchill, afterwards the great Duke of Marlborough, were the only persons saved. The solicitude the Duke was said to have shown on this occasion for the safety of his priests and his dogs contributed considerably to deepen the popular odium of which he was the object. Very soon after this he finally left Scotland, his government of which country had been throughout an oppressive and cruel tyranny, and again taking up his residence at the English court, became his brother's chief counsellor, and, much more than Charles himself, whose increased indolence and infirmities now more than ever indisposed him for exertion, the mainspring and director of the conduct of public affairs. To his instigation are chiefly attributed the general attack upon corporations, the executions of Russell and Sidney, and the other violent and despotic acts which crowd the two closing years of Charles's reign.

On the death of his brother, 6th February, 1685, no opposition was made to the accession of James. In his address to the privy council, he said, 'I have been reported to be a man for arbitrary power; but that is not the only story that has been made of me; and I shall make it my endeavour to preserve this government, both in church and state, as it is now by law established.' In his very first measures however the new king showed, to borrow the expressions of Hume, 'that either he was not sincere in his professions of attachment to the laws, or that he had entertained so lofty an idea of his own legal power, that even his utmost sincerity would tend very little to secure the liberties of the people.' He began by issuing a proclamation ordering the customs and excise duties to be paid as usual, although the parliamentary grant of them had expired with the termination of the late reign; and this step, it appears, he took after a secret consultation with the French minister, Barillon, with whom arrangements were soon completed for the continuance of the pension that Charles had received from King Louis, and the general dependence of the government upon that of France. (Sir John Dalrymple's *Memoirs of Great Britain*, Appendix, part i., pp. 100-113, and Fox's *History of the Early Part of the Reign of James II.*) In another direction James made an equally offensive display of his principles, by going openly and in great state to the illegal celebration of the mass; he even lost no time in sending an agent to Rome to make his submissions to the pope and to prepare the way for the re-admission of England into the bosom of the Catholic church.

He determined however to call a parliament, for reasons which he explained to Barillon partly in person, partly through the earl of Rochester, lord treasurer. 'Hereafter,' said he, 'it will be much more easy for me to put off the assembling of parliament, or to maintain myself by other means which may appear more convenient for me. . . . I know the English; you must not show them any fear in the beginning. . . . I will take good care to hinder parliament from meddling in foreign affairs, and will put an end to the session as soon as I see the members show any ill will.' By the mouth of Rochester, he observed in addition that he would be too chargeable to Louis if he should be obliged to come to him for all the supplies he at present wanted; what he was doing did not however exempt him from also having recourse to the French king for some assistance; he hoped that in the difficult beginning of his reign Louis would help him to support the weight of it; that this fresh obligation would engage him still more not to depart from the road which he used to think the deceased king his brother should have kept with regard to the French monarch; and would be the means of making him independent of parliament, and putting him in a condition to support himself without the assistance of that body, if they should refuse him the continuation of the revenues which the late king enjoyed. (Barillon's *Dispatch* of the 19th February.) When, a few days after, in compliance with these broad hints, or rather importunate solicitations, Louis transmitted bills for 500,000 livres, James expressed his gratitude in the most rapturous terms, even shedding tears as he spoke; and Rochester, Sunderland, and Godolphin hastened to Barillon to tell him he had given life to the king their master. It was readily agreed, in requital of Louis's bounty, that the chief obstacle which stood in the way of the seizure by the French king of the Spanish Netherlands should be immediately removed, by the existing treaty between Spain and England being held to have terminated with the death of Charles.

These curious details of its commencement supply the key-note to the whole course of James's disgraceful reign. All that followed flowed naturally from such a beginning. The parliament met according to proclamation on the 19th of May, and, in the usual temper of the nation at the accession of a new sovereign, was found abundantly compliant. The revenue which the king demanded was granted to him for life by the Commons, with little or no debate, and by a unanimous vote; and on almost every other subject that came before it that assembly manifested the same complete subserviency to the wishes of the court; a strong attachment to the Established church, and a still lingering horror of the popish plot, being the only dispositions on the part of the generality of the members that gave James any trouble in managing them. The influence of the court indeed had been unscrupulously employed in their election, and with so much success that James declared there were not forty of them whom he would not himself have named. A Scottish parliament, which had assembled a few weeks before that of England, responded to all the royal demands in a spirit still more slavish. Scotland indeed, by the unheard-of atrocities of the late king's government, had been now humbled for the moment almost to the point of utter despair. While the two parliaments were still sitting, both England and Scotland were invaded, the former by the duke of Monmouth, the latter by the earl of Argyle, both of whom had for some years been exiles in Holland. The disastrous issue of each of these attempts is well known. Argyle, after the dispersion of his few followers, was apprehended and executed at Edinburgh, on the 30th of June.

Monmouth, whose landing did not take place till the 11th of that month, by which time Argyle was all but an unattended fugitive, was, after having met in the first instance with a much greater promise of success than his confederate in the north had experienced, defeated, 5th July, in the decisive battle of Sedgemoor, and being two days after found concealed in a ditch, was brought to London, and delivered to the executioner on the 15th of the same month. His uncle obdurately refused to grant him either his life or even the briefest respite. The suppression of Monmouth's insurrection was followed by the savage military vengeance of Colonel Kirke, and the more revolting enormities of the western 'campaign,' as it was jocularly called by the king, of chief-justice Jeffreys. Between the two the south-western counties were strewed with the carcasses and the dismembered limbs of human beings, women as well as men, butchered by the sword or the axe.

When the parliament re-assembled in November, the king told them that in the late crisis he had employed a great many Catholic officers, and that he had, in their favour, by his own authority dispensed with the legal test of conformity to the Established Church to be taken by every person appointed to any public office. This was too much to be borne without some expressions of dissatisfaction and alarm; but the resistance of the House of Commons was exceedingly timid and feeble. A very respectful and submissive address having been answered by the king with great arrogance and violence, nothing further was done in the matter; the supplies were at once voted; and one of the members, who had ventured to observe, when the king's answer was read, that he hoped they were all Englishmen and not to be frightened by a few hard words, was even sent by a vote to the Tower for his audacity. In the Lords a more formidable opposition seemed to be threatened, to get rid of which the parliament was prorogued after it had sat for little more than a week. One of the acts of this parliament was to extinguish completely the liberty of the press by the revival of an act originally passed for two years in 1662 (the 13 and 14 Car. II., c. 33), and afterwards extended for seven in 1664 (by the 16 Car. II., c. 8); a most important piece of legislation, which yet, as Mr. Fox remarks, has been scarcely noticed by any historian.

James's persevering attempts however to establish the dispensing power, which in the particular instance he chose to begin with was an attack upon the established religion as well as upon the law, eventually involved him in a dispute with the Church, which was productive of the most important consequences. In the beginning of April, 1687, he published a declaration at once suspending and dispensing with all the penal laws against Dissenters, and all tests, including even the oaths of allegiance and supremacy, directed to be taken by persons appointed to offices civil or military. In Ireland all places of power under the crown were immediately put into the hands of Catholics. The earl of Castlemaine was at the same time publicly sent as ambassador extraordinary to Rome, to express the king's obeisance to the pope, and to effect the reconcilement of the kingdom with the holy see. In return the pope sent a nuncio to England, who resided openly in London during the remainder of the reign, and was solemnly received at court, in face of the act of parliament declaring any communication with the pope to be high treason. Four Catholic bishops were consecrated in the king's chapel, and sent to exercise the episcopal function each in his particular diocese. Even in Scotland and England, as well as in Ireland, offices of all kinds, both in the army and in the state, were now filled with Catholics; even those of the ministers and others who had shown themselves disposed to go farthest along with the king were dismissed, or visibly lost his favour, if they refused to conform to the antient religion. An attempt had already been made to compel the university of Cambridge to confer a degree of Master of Arts on a Benedictine monk. This was not persevered in; but soon after a vacancy having happened in the presidency of Magdalen College, Oxford the vice-president and fellows were ordered by royal mandate to fill it up by the election of a person named Farmer, a late convert to popery (for whom was afterwards substituted Parker, bishop of Oxford, who avowed himself a Catholic at heart), and on their refusal were cited before an ecclesiastical commission, and expelled. On the 27th of April, 1688, the king published a second declaration of indulgence to dissenters from the Established church, and commanded it to be read by the clergy immediately after divine service in all the churches. On this Sancroft, archbishop of Canterbury, and six bishops, Lloyd of St. Asaph, Ken of Bath and Wells, Turner of Ely, Lake of Chichester, White of Peterborough, and Trelawny of Bristol, met in the archbishop's palace at Lambeth, 18th May, and drew up a petition to the king, representing their aversion to obey the order, for many reasons, and especially because the declaration was founded upon such a dispensing power as parliament had often declared illegal. For this they were all, on the 8th of June, sent to the Tower, and afterwards, on the 29th, brought to trial before the Court of King's Bench, on the charge of publishing a false, fictitious, malicious, pernicious, and seditious libel, when a verdict of Not Guilty was pronounced by the jury, which was received with acclamations by the whole kingdom as a great national deliverance. This defeat however in no degree checked at the moment the infatuated king. To quote the summary of Hume, 'He struck out two of the judges, Powel and Holloway, who had appeared to favour the bishops; he issued orders to prosecute all those clergymen who had not read his declaration, that is, the whole Church of England, two hundred excepted; he sent a mandate to the new Fellows whom he had obtruded on Magdalen College to elect for president, in the room of Parker lately deceased, one Gifford, a Doctor of the Sorbonne, and titular bishop of Madaura: and he is even said to have nominated the same person to the see of Oxford.' It was in the midst of this great contest with the Church and the nation that, on the 10th of June, a son was announced to have been born to James, a piece of intelligence which was very generally received with a strong suspicion that the child was supposititious, and that the queen had never been delivered or pregnant at all. For this notion however it is now generally admitted that there was no good ground.

James's son-in-law, the Prince of Orange, had not been an unobservant spectator of what was passing in England; and to him the hopes of the English people were now very generally turned The heads of the several parties in the state, though probably with no great definiteness or complete union of views, joined in applying to him for his assistance to save the public liberties; and he at last made up his mind to comply with their solicitations. Having set sail with a fleet of about fifty men-of-war and 300 transports, having on board a land force of about 14,000 men, he landed, on the 5th of November, at Torbay in Devonshire. Before the end of that month James found himself nearly deserted by every body; all were gone over to the prince, the people, the gentry, the nobility, the army, his immediate servants and friends, even his children. In the night of the 12th December, having previously sent over the queen and the young prince to France, he embarked with a single attendant in a boat at Whitehall Stairs, with the intention of proceeding to the same country, but was driven back by contrary winds, and forced the next day to land at Feversham, from which he returned on the 16th to Whitehall. The next day the prince, having arrived with his army in London, desired James to leave the palace, on which he proceeded to Rochester, and on the 23rd embarked from that port on board a frigate, in which he was conveyed to Ambleteuse in Britanny. Hence he repaired to St. Germain's, where Louis XIV. received him with great kindness, gave him the castle of St. Germain's for his residence, and settled on him a revenue sufficient to support the expenses of his small court.

Meanwhile the English crown was settled upon the prince and princess of Orange as King William III. and Queen Mary. [WILLIAM III. and MARY.] In the beginning of March in the following year James, having sailed from Brest, landed at Kinsale, and thence immediately marched to Dublin, with a small force with which he had been supplied by the French king. A few weeks after he laid siege to Londonderry, which however he was not able to reduce, although his forces continued to encompass it for three months before it was relieved. He himself, returning to Dublin, held a parliament, and for some time continued to exercise the rights of sovereignty in that capital; but after various military operations, the detail of which belongs properly to the history of the next reign, his cause was finally ruined by the signal defeat which he received from King William in person at the battle of the Boyne, fought 1st July, 1690. [BOYNE.] He soon after returned to France, and continued to reside at St. Germain's till his death, 6th September, 1701, in the 68th year of his age.

By his first wife, Anne Hyde, James II. had the following children:—1. Charles, duke of Cambridge, born at Worcester House in the Strand, 22nd October, 1660, died 5th May, 1661; 2. Mary, afterwards queen of England; 3. James, duke of Cambridge, born 12th July, 1663, died 20th June, 1667; 4. Charles, duke of Cambridge, born 4th July, 1664, died 22nd May, 1667; 5. Anne, afterwards queen of England; 6. Edgar, duke of Cambridge, born 14th September, 1667, died 8th June, 1671; 7. Henrietta, born 13th January, died 15th November, 1669; and 8. Catherine, born 9th February, died 5th December, 1671. By his second wife, Mary of Modena, who survived till 8th May, 1718, he had, 9. Charles, duke of Cambridge, born 7th November, died 12th December, 1677; 10. Catherine Laura, born 10th January, died 4th October, 1675; 11. Isabella, born 28th August, 1676, died 2nd March, 1681; 12. Charlotte Maria, born 15th August, died 6th October, 1682; 13. James Francis Edward, prince of Wales, styled the elder Pretender, born 10th June, 1688, died at Rome, 30th December, 1765; and 14. Maria Louisa Teresia, born at St. Germain's, 28th June, 1692, died 8th April, 1712. He had also the following illegitimate issue: 1. By Arabella, sister of John Churchill, afterwards duke of Marlborough, Henrietta, born 1670, married Sir Henry Waldegrave, afterwards created Baron Waldegrave, died 3rd April, 1730; 2. By the same, James, surnamed Fitzjames, born in 1671, created duke of Berwick 1687, died 12th June, 1734; 3. By the same, Henry Fitz James, styled the Grand Prior, born 1673, died 7th December, 1702; 4. By the same, a daughter, who became a nun in France; 5. By Catherine, daughter of Sir Charles Sedley, created in 1686 countess of Dorchester for life, Catherine, born 1681, married 1699 to James Annesley, earl of Anglesey; secondly, after having obtained a divorce from him, to John Sheffield, duke of Buckingham; died 1735.

James II. employed part of the leisure of his retirement in writing an account of his own life, the original manuscript of which, extending to nine folio volumes, was preserved in the Scotch College at Paris till the Revolution, when it was forwarded to St. Omer for the purpose of being transmitted to England, but was there destroyed, having, it is said, been committed to the flames by the wife of the person to whose charge it was consigned, in her fears for the safety of her husband if it should be found in his possession. A digest or compendium however of the matter of the royal autobiography had been long before drawn up by an unknown hand, apparently under the direction either of James or his son; and this performance (of which there was also at least one other complete copy in existence), having formed the principal portion of the papers formerly belonging to the Stuart family, which were obtained by George IV. when regent, has been printed under the title of 'The Life of James the Second, King of England, &c., collected out of Memoirs writ of his own hand. Together with the King's Advice to his Son, and his Majesty's Will. Published from the Original Stuart Manuscripts in Carlton House, by the Rev. J. S. Clarke, LL.B., F.R.S., Historiographer to the King, Chaplain of the Household, and Librarian to the Prince Regent,' 2 vols. 4to., Lond. 1816.

JAMES RIVER. [VIRGINIA.]

JAMESONITE, a mineral, which occurs crystallized and massive. It consists of—sulphur 0·225, lead 0·387, antimony 0·349, iron 0·026. Its specific gravity is 5·564.

JANEIRO, RIO DE, commonly called Rio, but whose full name is S. Sebastião de Rio de Janeiro, the capital of the empire of Brazil in South America, is situated in 22° 54′ S. lat. and 43° 15′ W. long., on the western shores of a large and safe bay, called Bahia do Rio de Janeiro.

This bay is only inferior in extent to Bahia de Todos os Santos, being nearly 24 miles in length, almost north and south, 15 miles in its greatest width, and about 120 miles in circuit. Its entrance at the southern extremity is rather narrow, being formed by two rocky and projecting tongues of land, whose extremities are hardly a mile distant from one another. On the extreme point of the eastern tongue is built the fortress of S. Cruz, and on that of the western the batteries of S. Jose and S. Theodosio. At no great distance from, and opposite to, the entrance, but within the bay, is a low rocky island, Ilha da Lagem, on which also a fortress is built, so that the entrance of the bay is very well defended. The average depth of the entrance is 14 fathoms: good anchoring ground is found everywhere within the bay. As the tide rises within the bay 16 feet at full and change, some precaution is necessary to avoid anchoring in too shallow water at high tide. The bay, being at a short distance from its shores enclosed by high hills and mountains, is not exposed to any kind of wind, and in every respect is one of the best harbours on the globe. It is diversified by numerous islands and rocks, but only one of them is of considerable extent, the Ilha do Governador, situated in the northern and wider portion of the bay. Numerous rivers fall into the bay. Though all of them have a short course, most of them are navigable for a few miles from their mouth, and facilitate the transport of the produce to Rio de Janeiro.

Near the entrance of the bay, and where it is only from four to eight miles wide, the town is built on its western shore, as already observed. It extends along the shore about three miles on an undulating plain, which contains a high hill with the church of Nossa Senhora da Gloria on it. To the west of the plain rises a range of high hills called Corcovado, containing many picturesque valleys, among which that of Laranjeiras, or 'of the oranges,' is distinguished by its beauty. The substance of which the mass of the hills round the town is composed is gneiss, in which numerous quarries are opened near the city. The gneiss is intersected by granite veins varying in thickness from two or three feet to as many inches. That part of the town which is south of the hill Da Gloria is very narrow, consisting only of one or two streets which extend south as far as the small bay of Botafogo. The city or principal town is built a little north of the hill Da Gloria, and on a rocky shore of some elevation opposite the small island called Ilha das Cobras. A fine pier of stone projects a short distance into the bay, and is ascended by a flight of steps. It leads immediately to the Palace Square, which is 150 yards long and 80 wide. Two sides of this square are occupied by the Imperial Palace, which was formed by uniting the Palace of the Viceroys, which stands on the southern side of the square, with the Convent of the Carmelites and the Senate-house by passages; the two latter buildings occupy the western side of the square. The palace has more the appearance of a manufactory than of the residence of an emperor. The northern side of the square is occupied by a row of houses two stories high, which are private property. The city itself stands on a level plain, and extends in the form of a rectangular oblong from north-west to south-east; on its northern border are five low hills. It consists of eight straight and parallel but narrow streets, intersected by many still narrower streets at right angles. A large square, called Campo de S. Anna, which joins it on the north west, divides the city from the Cidade Nova, or New Town, which extends westwards to the neighbourhood of the royal villa of S. Christovão.

The streets are paved, and they also have foot-pavements, which however are so narrow as scarcely to admit of two people passing one another. The houses are generally built of stone, and have two stories: the upper one is sometimes of wood: the roofs are of tiles. The latticed windows, which formerly were general, have disappeared. The town is lighted but sparingly, and only for a part of the night. The most distinguished buildings are the cathedral, and the churches De Candelaria and S. Francisco de Paula. The college, which once belonged to the Jesuits, is also a fine building; and a magnificent theatre and an Exchange in a good style have lately been erected. The most remarkable of the public buildings is the aqueduct, which brings down the water from the mountains of Corcovado (2400 feet, according to others 2100 feet, above the sea) to the town. It consists of two walls built of hewn stone, a yard from each other, the space between being arched over with bricks. The water thus brought to the town is distributed into several fountains, but not conducted to the houses, as is the case in many other towns in South America.

Rio de Janeiro contains a population of more than 200,000. The number of whites and of black slaves seems to be nearly equal; the people of colour are comparatively few in number. Most of the inhabitants are engaged in the different branches of commerce. There are some manufactures, as sugar-houses, tanneries, cotton manufactures, rum distilleries, and houses for the extraction of train oil. Several persons are occupied with cutting diamonds and other precious stones. Charitable institutions are not wanting, though they are scanty in proportion to the great population. There is a large library, an academy of arts, a military academy, an observatory, a botanical garden, and a grammar-school, and steps have lately been taken to in-

crease the number of such and similar institutions. As to the commerce of Rio, see **Brazil**, vol. v., p 268.

(Cazal, *Corografia Brasilica;* Henderson's *History of Brazil ; Travels in Brazil of* Spix *and* Martius; Caldcleugh; *On the Geology of Rio de Janeiro,* in *Geolog. Trans.*, 2nd series, vol. ii.)

JANI'RA. [**Isopoda**, p. 55.] The word is also employed by Oken to designate a genus of *Acalephans* apparently nearly allied to the *Callianiræ*.

JANIZARIES is the name of a Turkish militia once formidable but now extinct. The origin of this body dates from the reign of Amurath, or Murad I, who, after having overrun Albania, Bosnia, Servia, and Bulgaria, claimed the fifth part of the captives, from among whom he chose the young and able-bodied, and had them educated in the Mohammedan religion, and for the military profession. These recruits, being duly disciplined, were formed into a distinct body of infantry, divided into ortas, or battalions, and they were consecrated and blessed by a celebrated dervish called Hadji Bektash, who gave them the name of Yeni Cheri, or 'New Soldiers.' They soon became the terror of the enemies of the Ottomans: being completely weaned from their friends and homes, they were enthusiastically devoted to the sultan as their common father; and a strict discipline, regular pay, and constant service gave them habits of order and obedience far superior to the irregular bodies which formed at the time the armies of the princes of Christendom. After the death of Solyman the Magnificent, and the general though gradual decay of the Ottoman warlike spirit, when the sultans no longer took the field in person, the Janizary body was no longer recruited exclusively from choice and young captives, but by enrolments of Osmanlees, who, being born and bred in the faith of Islam, had not the zeal of proselytes, and were besides connected by ties of consanguinity and friendship with the body of the people around them, and not exclusively devoted to the will of the sultan. In 1680 Mohammed IV. abolished the law by which the Christian rayahs, or subjects of the Porte, were obliged to give a portion of their children to the sultan to be educated in the Mohammedan faith and enrolled into the militia. By the original laws of their body the Janizaries could not marry, but by degrees the prohibition was evaded, and at last totally disregarded. Their children's names were then inscribed on the rolls of their respective ortas; and their relations and friends, men often unfit for any warlike service, obtained a similar honour, which gave them certain privileges and protection from the capricious oppression of their rulers. In this manner a crowd of menials, low artisans, and vagabonds, came to be included in the body of Janizaries; even rayahs and Jews purchased for money the same privilege; but all this motley crew lived out of the barracks, where only a few in time of peace were present at the appointed hours for receiving their soups or rations. Military exercises were abandoned; the Janizaries merely furnished a few guards and patroles for the city, many of them being only armed with sticks; and they never assembled as a body except on pay-day, when they defiled two by two before their nazirs, or inspectors. Still they were formidable to the government from their numbers, which were scattered all over the empire, and their influence and connexions with the mob of the capital. They repeatedly mutinied against the sultans, and obliged them to change their ministers, or even deposed them. In our own days they dethroned Selim; and in the beginning of the reign of the present Sultan Mahmood they broke out into a dreadful insurrection which lasted three days, and in which the Vizir Mustapha Bairactar lost his life. In both instances they were impelled by their hatred of the Nizam Djedid, or new troops, disciplined after the European fashion. At last Mahmood resolved to put down the Janizaries; and having for several years matured his plan with the advice of his favorite Halet Effendi, and gained over their aga and others of their principal officers, he issued an order that every orta or division should furnish 150 men to be drilled according to the European tactics. This, as he had foreseen, led to a revolt; the Janizaries assembled in the square of the Etmaidan, reversed their soup-kettles according to their custom in such cases, and, invoking the name of their tutelar saint Hadji Bektash, they began by attacking and plundering the houses of their enemies. But the body of topjis, or cannoniers, the bostandjis, or guards of the seraglio, and the galiondjis, or marines, were prepared; the sultan, mufti, and the ulemas, assembled in the mosque of Achmet, pronounced a curse and a sentence of eternal dissolution on the body of the Janizaries; the sandjak shereef, or sacred standard, was unfurled, and a general attack on the Janizaries began, who, cooped up in the narrow streets, were mowed down by grape-shot, and the rest were despatched by the muskets and the yataghans of their enemies, or burned in their barracks. About 25,000 Janizaries are said to have been engaged in the actual revolt, and most of them perished: the others concealed themselves or were exiled into Asia. This carnage took place in June, 1825, and from that time the Janizaries as a body have ceased to exist. Macfarlane, in his 'Constantinople in 1828,' gives a vivid account of that catastrophe.

JANSENISTS, a sect which appeared in the Roman Catholic church about the middle of the seventeenth century. They professed not to attack the dogmas but only the discipline of that church, which however stigmatized them as heretical in some of their tenets. They took their name from Janssen, or Jansenius, bishop of Ypres in the Netherlands, who published a book entitled 'Augustinus,' in which he supported, by means of passages from the writings of St. Augustine, certain principles concerning the nature and efficacy of divine grace which appear to partake greatly of Calvin's doctrine of predestination. This question of grace and predestination had already been discussed in the church at various times, and had proved a stumbling-block to many theologians. Michael Baius, professor at Louvain, had been condemned in 1567 by a Papal bull, and obliged to disown seventy-six propositions taken from his writings, chiefly concerning that abstruse subject. Jansenius however died quietly at Ypres in 1638, and it was not till several years after his death that some Jesuit theologians, on examining his book, discovered in it the following five propositions, which they denounced as heretical:—1. That there are certain commandments of God which even righteous men, however desirous, find it impossible to obey, because they have not yet received a sufficient measure of grace to render obedience possible. 2. That nobody can resist the influence of inward grace. 3. In our fallen state of nature it is not required, in order that we be accounted responsible beings, that we should be free from the internal necessity of acting, provided we are free from external constraint. 4. The Semi-Pelagians were heretical in maintaining that the human will has the choice of resisting or obeying the internal grace. 5. That to maintain that Christ died for all men, and not solely for those who are predestinated, is Semi-Pelagianism.

After much controversy, these five propositions were condemned by a bull of Pope Innocent X., in the year 1653, as impious and blasphemous, and the bull was received by the French prelates, and promulgated throughout France with the king's consent. Several learned men, who disliked the Jesuits and their latitudinarian system of ethics, wrote not to defend the five propositions, but to prove that these propositions did not exist in the book of Jansenius, at least not in the sense for which they were condemned. The Jesuits again appealed to the pope, and a curious question arose for the pope, which was, to determine the exact meaning of an author who was dead. Alexander VII. however, by a new bull, in 1656, again condemned Jansenius's book as containing the five propositions in the sense ascribed to them by the former bull. Arnauld and other learned men of Port-Royal persisted in denying this assumed meaning; and thus they, and all those who thought like them, received the appellation of Jansenists. A formulary was now drawn out conformable to the Papal bull, which all ecclesiastical persons in France were required to sign, on pain of being suspended from their functions and offices. A great many refused, and this occasioned a schism in the French church, which lasted many years. Arnauld, Pascal, Nicole, and other reputed Jansenists attacked vehemently the corruption, discipline, and morality of the church, and the Jesuits as supporters of that relaxation. They also inculcated the necessity of mental rather than outward or ceremonial devotion; they promoted the knowledge of the Scriptures among the people, and they encouraged general education by numerous good works which came from the press of Port-Royal. Meantime the controversy with Rome continued, although Clement IX., in 1668, entered into a sort of compromise with the French non-subscribing clergy, and Innocent XI. behaved with still greater moderation towards them. But Father Ques-

nel's 'Moral Observations on the New Testament,' published in 1698, added fuel to the flame. Quesnel, being now considered at the head of the Jansenist party, was driven into exile; Louis XIV., urged by his Jesuit confessor, suppressed the monastery of Port-Royal in 1709; and Pope Clement XI., in 1713, fulminated the bull 'Unigenitus' against 101 propositions of Father Quesnel's work. [CLEMENT XI.] A fresh contention now arose; a great part of the French clergy, many of whom were not Jansenists, including Cardinal de Noailles, appealed from the bull of the pope to a general council. The Regent d'Orléans however insisted on unconditional submission to the bull, and the recusants, or 'appellants,' were persecuted and driven into exile. This persecution made many fanatics, and Jansenism became a name for a set of visionaries and impostors. A certain Abbé Paris, who had been one of the appellants, and had died in 1727, was said to perform miracles from his tomb. For an investigation of these pretended miracles see Bishop Douglas's *Criterion, or Miracles Examined.* Next came a set of men called Convulsionnaires, who were seized with spasms and ecstasies; and others who were styled Flagellants, who whipped themselves in honour of the Saint Abbé Paris. This frenzy lasted for years, and the government by harsh measures only increased it; in fact it became mixed up with political discontent, and the parliament of Paris took the part of the appellants. [DAMIENS.] At last the paroxysm subsided, having had the effect of discrediting the name of Jansenism, which, as a sect, never afterwards revived, though its opinions are still held by many. As the original Jansenists maintained the absolute independence of the civil power on ecclesiastical authority, and as even in ecclesiastical matters they were not favourable to the supremacy of the Roman see, their principles had the effect of inducing many of the French clergy to take the oath to the constitution of 1791; these were called 'prêtres insermentés,' and were considered as schismatics by the see of Rome. The Jansenist principles extended to Italy, especially to Tuscany, where bishop Ricci and his partisans also effected a temporary schism.

JANSSEN, CORNELIUS, was born at Amsterdam, and lived several years in England. He was employed by King James I., and painted several fine portraits of that sovereign and of his children, as well as of the principal nobility. His colouring is very clear and natural; the carnations are remarkably soft, and except in freedom of hand and in grace he was esteemed equal to Vandyck, and in finishing superior to him. He generally painted on pannel, and his draperies are commonly black, which he probably chose because that colour gives greater brightness to the flesh tints. His pictures still retain their original lustre, which is supposed to be in consequence of his having used ultramarine in his black colours, as well as in the carnations. He left England soon after the arrival of Vandyck, about the beginning of the civil wars, and returned to his own country, where he died in 1665.

JANSSENS, ABRAHAM, born at Antwerp in 1569, was a competitor of Rubens, and was considered to be equal to him in many of the most important parts of the art. In colouring he was certainly inferior to Rubens alone. His compositions are spirited, his drawing correct, his pencil decided, and his draperies natural and free from stiffness. He painted subjects illuminated by torchlight, and delighted in the contrast of the most brilliant light with the deepest shade. Most of the Flemish churches possess fine pictures by this master.

JANSSENS, VICTOR HONORIUS, born at Brussels in 1664, after having been for four years painter to the duke of Holstein was sent by his highness, at his own request, to Italy, where he diligently studied Raphael and the antique, and sketched the beautiful scenery in the environs of Rome. His paintings were soon so highly esteemed that he was employed by the chief nobility of Rome. He composed historical subjects both on a large and small scale, but the latter being most sought after, he in general painted in that size. He took Albano for his model, and was superior in his own style to all his contemporaries. On his return to Brussels his pictures were as much admired there as they had been in Italy; but having a large family to support, he found it most profitable to paint large pictures; and most of the palaces and churches of his own country are adorned with his compositions. His invention was fruitful, and his execution rapid, as appears from the vast number of his works. He died in 1739.

P. C., No. 799.

JA'NTHINA, or IANTHINA, Lamarck's name for a genus of turbinated testaceous mollusks of remarkable habits.

Linnæus placed the form among the *Helices*, under the name of *Helix Janthina*, between *Helix perversa* and *Helix vivipara;* and he was aware of its Pelagic distribution.

Lamarck arranges it next to *Natica*, the last genus of his *Neritaceans*, between which family and the *Macrostomes* it appears in his list of *Phytiphagous* (plant-eating) *Trachelipods.*

Cuvier assigns to the *Janthinæ* a place among his *Pectinibranchiate Gastropods*, between the *Pyramidellæ* and the *Neritæ*.

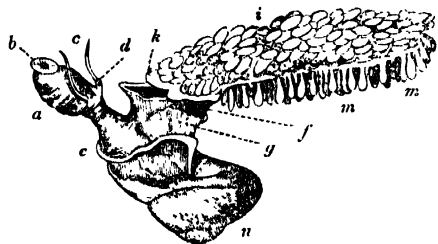
M. De Blainville elevates the group into a family, under the name of *Oxystomes*, being the fifth and last of his order *Asiphonobranchiata*. This family comes next to the *Hemicyclostomes*, which comprise the *Nerits*, &c.

M. Rang makes *Janthina* a genus of the *Trochoïds* of Cuvier, giving it a position between *Ampullaria*, Lam., and *Litiopa*, Rang.

Generic Character.—Animal with a very large *head* and a proboscidiform muzzle, at the extremity whereof is the *mouth* furnished with two vertical subcartilaginous lips (which are armed with long and very sharp points curved inwards), and with a lingual enlargement (renflement); *tentacles* two, conical, pointed, not very contractile, and very distant, each bearing at its base a rather long peduncle, which is oculated beneath its extremity; *foot* oval, divided into two parts, the anterior being concave and in the form of a cupping-glass (ventouse), the latter flattened, thick, and fleshy; *natatory appendages* lateral, rather large and fringed; *respiratory cavity* very open, and containing two pectinated *branchiæ;* orifice of the *ovary* at the bottom of this cavity; exciting *male organ* very small, and on the right side.

Shell ventricose, globular or conoid, very fragile, with a low spire, and the last whorl larger than all the rest together; *aperture* large, subtriangular, with disunited borders; the *columella* straight and long, forming the whole of the left border or lip; right border or lip trenchant, and often notched in the middle; *colour* of all the species hitherto discovered violet, more or less intense.

Operculum modified into a vesicular appendage, which serves to suspend the animal at the surface of the water, and which adheres to the posterior and fleshy part of the foot.



Janthina Fragilis (Common Oceanic Snail) Shell with the animal, the float expanded *a*, head; *b*, mouth; *c*, tentacles; *d*, eyes; *e*, border of the mantle at the entrance of the branchial cavity; *f*, foot, the posterior part, which is flat, *g*, lateral expansion of the mantle, provided for swimming, *k*, foot, anterior part forming a sort of pouch; *i*, bunch of aerated vesicles, serving to suspend the mollusk at the surface of the water, *m*, eggs suspended under the vesicular bunch; *n*, shell. (Rang)

Geographical Distribution very extensive, the form having been met with in the four quarters of the world floating on the ocean or driven on the shores by tempests. It has occurred on the coasts of our islands, but there is reason for thinking that it is not to be found in very cold latitudes. In warm climates it is very plentiful.

Habits, Reproduction, Food, &c.—Sir Everard Home published in the 'Phil. Trans.' for 1817, a paper which is appended (Appendix, No. III.) to Captain Tuckey's 'Narrative of the Expedition sent to explore the River Zaire, usually called the Congo,' wherein he describes and figures among other ova of mollusks, or *Vermes Testacea*, as he denominates them, the camerated nidus of *Helix Janthina* (pl. xiii., figs. 1, 2, 3, 4, 5, 6). 'This animal,' observes Sir Everard, 'not living at the bottom of the sea, like the Vermes testacea in general, deposits its ova upon its own shell, if nothing else comes in its way; one of the specimens of the shell of the Janthina caught in the voyage to the Congo fortunately has the ova so deposited.' And he then

refers to the drawings of Mr. Bauer, engraved as above quoted.

In the 4th vol. of the 'Journal of the Philadelphia Academy' will be found 'Remarks on the floating apparatus and other peculiarities of the genus Janthina,' by Reynell Coates, M.D. This highly interesting paper, the result of the author's personal observations during a voyage to the East Indies, establishes the correctness of Cuvier's remark, that no anatomical connexion exists between the animals and the air-cells of their float; but does not corroborate the views of Sir Everard as to the camerated nidus on the shell which he saw with so much satisfaction. Dr. Coates placed some *Janthinæ* in a tumbler of brine, and having removed a portion of the float of one with scissors, the animal soon set to work to supply the deficiency after the following manner:—The foot was advanced upon the remaining vesicles, until about two-thirds of that part rose above the surface of the water; it was then expanded to the uttermost, and thrown back upon the water, like the foot of a *Lymnæa* when it begins to swim; it was then contracted at the edges, and formed into the shape of a hood, enclosing a globule of air, which was slowly applied to the extremity of the float. There was now a vibratory movement throughout the foot, and when it was again thrown back to renew the process, the globule was found enclosed in its newly-made envelope. From this it results that the membrane enclosing the cells is secreted by the foot, and that there is no attachment between the float and the animal, other than that arising from the nice adaptation and adjustment of proximate surfaces. Dr. Coates states that the float varies in different species. In *Janthina fragilis* he describes it as convex, subcarinate above and concave beneath, straight, and composed of large vesicles: in *J. globosa* he found the vesicles smaller, and the float flat both above and beneath, added to which it is formed by the reunion of one of the edges into a spiral and nearly circular disk. In *J. exigua* it was straight, narrow, and flattened, and the vesicles were small. Along the under surface of the float a little line of pearly fibres was remarked, to which are attached the eggs of the animal.

Although Dr. Coates had no opportunity of observing the eggs of *J. fragilis*, he is strongly inclined to believe that the eggs figured and described in 'Phil. Trans.,' as above alluded to, belong to some other marine animal; and he grounds his belief on the dissimilarity between those figures and the eggs of *J. globosa* and *J. exigua*. In these two species the eggs are contained in little membranous bags of some consistence, which are attached in rows to the pearly fibres of the under surface of the float by small filamentous pedicles similar in appearance to the fibres. These bags are covered with minute, gelatinous, conical eminences, and are partially divided by incomplete septa, as may be seen by the aid of a powerful lens. In *J. exigua*, the division is very partial; but in *J. globosa* it gives to the whole sac a chambered appearance. It would seem that the animal consumed considerable time in depositing its eggs, for the bags nearest to the extremity of the float were constantly found empty, while the central bags contained young shells fully formed: those towards the animal were filled with eggs. The probability is, that the young animals when hatched ascend the float of the mother, and thus gaining access to the surface, construct the elements of their future support.

M. Rang, who also notices Sir Everard's statement, mentions it as certain that *Janthina* deposits its eggs sometimes in considerable number, as he has had occasion to remark, under the float, where they are attached by means of small pedicles; and he goes on to say, that the animal abandons them, together with the float, which is then charged with their preservation. M. Rang adds, that it is possible that, at this epoch, the natatory appendages of the mantle, being sufficiently developed, permit the animal to use them for swimming, and thus supply the loss; or one must suppose that these animals have the faculty of replacing the float. That they have that faculty we have, above, seen.

Browne, in his 'Natural History of Jamaica,' gives by no means a bad account of the floats of these animals, many of which he encountered between the Bermudas and the Western Islands, in his voyage from Jamaica. He says, 'I have observed many of the vesiculæ themselves swimming upon the surface of the water, which induced me to think that they were thrown off as the creatures retired.' Sloane also saw these oceanic snails, and figures them.

In January, 1833, Dr. Grant exhibited to a meeting of the Zoological Society of London numerous specimens of *Janthina vulgaris*, Lam., and of *Velella limbosa*, Lam., both animals of rare occurrence on the English coast, and chiefly met with floating in tropical or warmer seas. They were obtained by him at the beginning of September, 1832, in Whitsand Bay, close to the point of the Land's End, Cornwall, where they were thrown in great numbers on the sands, after a storm of three days' continuance from the north-west: they must, he observed, consequently have been floating before they were directed to the coast by the storm, in latitudes at least as high as that in which they were found. Dr. Grant regards it as probable that neither of these animals is capable of discharging at will the gaseous fluid by which they are supported on the surface of the sea; otherwise, in such a violent and continued tempest as that which stranded them, they would have emptied their vesicles and have sunk to the stiller bottom. (*Zool. Proc.*) Browne on the other hand says, speaking of the float, 'This raises and sustains it while it pleases to continue on the surface; but when it wants to return, it throws off its bladder and sinks.'

Lamarck placed *Janthina* among the plant-eaters; but in the communication by Dr. Grant above noticed, it is suggested that *Janthina*, a predaceous *Gastropod* accompanying *Velella*, as there described, may prey upon it, and acquire from it the blue colouring matter of its shell.

Several authors speak of the beautiful purple liquor which the living animal diffuses when it is touched.

We select as an example *Janthina fragilis*.

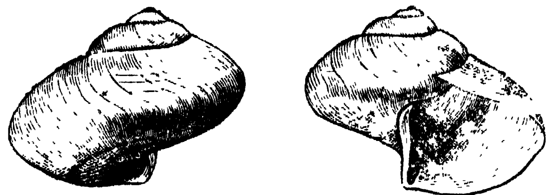
Description.—Shell pale; body whorl angulated; the base flattened, striated, and deep violet; aperture broader than long; outer lip deeply emarginate. (Swainson.)

Locality.—Oceanic in warm and temperate climates; several instances are recorded of its capture near the British Islands, and on them.

Janthina exigua has also occurred on the English and Irish coasts. (*Zool. Proc.*, 1835.)

Mr. Swainson, who in his 'Zoological Illustrations' has given beautifully correct figures of *J. fragilis* and *J. globosa*, justly remarks that the shells are so brittle that it is rare to find them perfect.

M. de Blainville is inclined to think that those shells which are notched belong to females.



Shell of Janthina fragilis.

FOSSIL JANTHINÆ?

Mr. G. B. Sowerby (*Genera*) states that he has never seen any fossil species of this genus, nor is he aware that any exist, but he refers to a fossil engraved in *Min. Con.* pl. 10, which bears a very near resemblance to it. The fossil is named, in the valuable work alluded to, *Helix carinata*, and the solid grey limetone near Settle in Yorkshire is said to be the locality. *Janthina* does not appear in the tables of M. Deshayes.

JANUARY, the first month in our present Calendar, was also the first month in the Roman Calendar. It was not the first month of the year in this country till 1752, when the legislature, by an act passed in the preceding year, altered the mode of reckoning time from the Julian to the Gregorian style. At this time it was directed that the legal year, which then commenced in some parts of this country in March, and in others in January, should universally be deemed to begin on the first of January. January derives its name from Janus. Macrobius expressly says it was dedicated to him because, from its situation, it might be considered to be retrospective to the past, and prospective to the opening year. It consists of thirty-one days, though originally of only thirty days. The Anglo-Saxons called January *Wolf-monath*. (Brady, *Clavis Calendar.*, i. 55, 56; Macrobii *Saturn.*, i. 13.)

JANUS, in mythological history, is the earliest of the Italian kings, and reigned in Latium, being contemporary with Saturn. He was succeeded by Picus and Faunus,

who, as well as himself, were worshipped by the Etruscans and Romans. Janus, by some accounts, was the son of the sun, and his attributes appear to connect him with sun-worship. He is the porter of heaven; he opens the year, the first month being named after him; he presides over the seasons, whence he is sometimes represented with four heads (Janus Quadrifrons), and his temples in that capacity were built with four equal sides, but only one entrance. He presides over production. He is the keeper of earth, sea, and sky; the guardian deity of gates, on which account he is commonly represented with two heads, because every door looks two ways; and thus he, the heavenly porter, can watch the east and west at once without turning. (Ovid, *Fast.*, i. 140.) He usually carries a key in his left hand and a staff in the other. (*Ib.*, 99.) His temples at Rome were numerous. In war time the gates of the principal one, that of Janus Quirinus, were always open; in peace they were closed to retain the wars within (*Ib.*, 124); but they were shut once only between the reign of Numa and that of Augustus. In reference to this attribute he has the epithets of Clusius and Patuleius, the shutter and opener. All his attributes, numerous and complicated as they are, appear to have reference to this notion of opening and shutting, and are explained, by those who see in Janus a modification of the sun, in reference to the phenomena of day and night, and the pervading vivifying influence of the solar rays. As to the probable origin of the word Janus, see the article DIANA.

JAPAN is an empire in Asia, which consists of an unknown number of islands of different dimensions. These islands may be considered as constituting the western boundary of the Pacific between 31° and 45° N. lat.; but the Japanese settlements on the island Tshoka, or Tarakai, better known by the name of Sakhalia, seem to extend as far north as 47° or 48° N. lat. Between these islands and the continent of Asia is a closed sea, called the Sea of Japan, which at its southern extremity is united to the Tong-Hai, or Eastern Sea of the Chinese, by the Strait of Corea, and at its northern with the Sea of Okhotzk, or Tarakai, by the still unexplored strait which divides the island of Tarakai from Manchuria. The Sea of Japan is united to the Pacific by several straits, which divide the Japanese islands from one another. The most remarkable is the Strait of Sangar between the large islands of Nipon and Yeso. Japan is situated between 129° and 150° E. long. from Greenwich. It is divided into Proper Japan and the dependent islands.

Proper Japan consists of three large islands, Kioosioo, Sitkokf, and Nipon or Nifon, which are surrounded by a great number of smaller islands. Kioosioo, the most western, may be about 200 miles long, with an average breadth of 80 miles, which would give it a surface of 16,000 miles, nearly equal to that of the island of Sardinia. On its western coast are two deep bays, that of Simabara, in the middle, which is by far the largest, and that of Omoora, north of it: at its southern extremity is the Bay of Kangosima. Kioosioo is separated from Sitkokf by the Boongo Channel, and from Nipon by the Suwo Sound and the Strait of Simonoseki. Sitkokf may be 150 miles long, with an average breadth of 70 miles; it probably contains more than 10,000 square miles, and is much larger than the island of Corsica. The long strait which divides it from Nipon on the north is in some places hardly more than a mile wide; but about the middle a large bay enters deeply into the island of Sitkokf. The eastern extremity of this island is separated from Nipon by the Bay of Osacca, which contains the island of Avasi. Nipon, the largest and the principal of the Japanese islands, has the form of a curve, or, as Kämpfer says, of a jawbone. Its length, measured along the middle of the island, exceeds 900 miles, and its average width may be estimated at more than 100 miles: its surface may therefore cover an area of about 100,000 square miles, or considerably more than that of Great Britain. Its largest bays are along the southern coast, as Osacca Bay, Mia Bay, and Yedo Bay.

The dependent countries are the large island of Yeso, with some of the Kurile Islands and the southern districts of Tarakai. Yeso has a very irregular form. Its length, from west-south-west to east-north-east, is more than 250 miles, and its average width perhaps does not fall short of 100 miles. This gives a surface of 25,000 square miles, or somewhat less than that of Ireland. Only the two southernmost of the larger Kurile Islands, Kunashir and Uturup, are occupied by the Japanese: the others belong to the Russian empire. The island of Tarakai, whose southern portion is called Tshoka, is divided from Yeso by the Strait of Perouse. It is certain that the Japanese have formed some settlements here, but it is not known how far they extend northward. According to this rough estimate, and excluding the settlements on the island of Tarakai, the Japanese empire contains about 160,000 square miles.

All these islands are very imperfectly known: not even the coasts are laid down with any degree of correctness. This arises partly from natural and partly from political causes. Nearly all the coasts are very difficult of access, being surrounded by numerous rocks and islands, and by a very shallow sea. This shallowness is most remarkable in the numerous inlets and bays with which the southern coast is indented. The harbour of Yedo, for instance, is so shallow that even small boats cannot approach the beach the larger Japanese vessels keep far out to sea, and a European ship would be obliged to anchor at five leagues' distance. The harbour of Osacca is not much better. This circumstance accounts for the smallness of all Japanese vessels, and their unfitness to keep the sea in a gale. They can only be employed in the coasting trade. The sea, besides containing numerous rocks, has some very dangerous whirlpools, two of which especially have been noticed by navigators, one near the island of Amakoosa, at the entrance of the Bay of Simabara, and the other near the southern extremity of Nipon, between the bays of Osacca and of Mia. To this must be added, that no part of the ocean is subject to heavier gales than the sea which surrounds Japan: they frequently blow with the fury of hurricanes. The government also and the laws of the Japanese are less favourable to intercourse with foreigners than those of any other country on the globe, China not excepted. If foreigners who arrive at the ports, after a delay of many days and even weeks, are at last permitted to set foot on shore, a small spot of ground is assigned to them, which has previously been enclosed with strong palisadoes. Under such circumstances our knowledge of the country must be very scanty, and we owe such as we have nearly exclusively to the circumstance that the Dutch, who are permitted to trade in the harbour of Nagasaki, are obliged to send annually an embassy to Yedo, which gives them an opportunity of examining, though very imperfectly, the southern coast of Nipon between Simonoseki and Yedo.

Some of these travellers, Thunberg for instance, assert that the whole surface of these islands is only a succession of mountains, hills, and valleys; but Kämpfer expressly says that he passed through several plains of considerable extent, as that which runs from the town of Osacca to Meaco, a distance of about twenty miles, and a similar plain west of Yedo, and extending to that town. A large plain occurs also along the northern shores of the bay of Mia, and numerous smaller plains are noticed by Kämpfer. But generally the hills run down close to the sea, or leave only a narrow strip of level ground between them and the sea-shore. Though Japan is doubtless a very hilly country, it can hardly be said to be mountainous, as by far the greatest number of the eminences are cultivated to the very top, and those few which are not cultivated are left in their natural state on account of the sterility of the soil. The Dutch have observed only one single peak of great elevation, the Fudsi Jamma, not far from the bay of Tomina, west of the bay of Yedo. They compare it in shape with the Peak of Teneriffe, and observe that the snow seldom melts on its top. According to the accounts of navigators however, it would seem that the northern part of Nipon is traversed by a continuous chain of mountains with several peaks. Volcanoes, either in an active state or extinct, are numerous, to the latter class the Fudsi Jamma seems to belong. Some active volcanoes occur on the islands scattered in the strait of Corea, as the Sulphur Island, noticed by Captain B. Hall.

From the peculiar form of these islands it may be presumed that they have no large rivers; and the rapidity with which they run down shows that the country in the interior rises to a considerable height. Many of them are so rapid that no bridges can be built over them, and they are not passed without danger. Several others are less rapid, and though they cannot be navigated, timber and wood are floated down them. A considerable number however seem to be navigable for small river-boats to a distance of some miles from the sea. The most considerable and important of those which are known is the river Yedogawa,

in Nipon, which rises in the lake of Oitz, a sheet of water sixty miles in length but of inconsiderable width. After leaving this lake it traverses the fine plain which extends from its shores to the harbour of Osacca, and in all this course it is navigated by river-barges.

We are of course very imperfectly acquainted with the climate of Japan, the meteorological observation made by Thunberg at Nagasaki only extending over one year. The southern part seems to resemble in many points the climate of England. In winter it does not freeze and snow every year, though this is generally the case: the frost and snow, when there is any, last only a few days. In January, 1776, the thermometer descended at Nagasaki to 35° Fahr., but it was considered a very mild winter; in August it rose to 98°, and that was considered as the average heat of the season. The heat would consequently be very great but for the refreshing breeze which blows during the day from the south, and during the night from the east. The weather is extremely changeable, and rains are abundant all the year round; but they are more heavy and frequent during the *satkasi*, or rainy season, which occurs in June and July. Storms and hurricanes seem to occur frequently, and the descriptions of them in Kämpfer and Langsdorf are truly terrific. Thunder-storms are also common, and earthquakes have successively destroyed a great part of the most populous towns. Only a few spots appear to be exempt from these terrible phenomena. It is observed by Kämpfer that water-spouts are nowhere of such frequent occurrence as in the seas enclosing Japan.

In no part of the world is agriculture carried to a higher degree of perfection than in Japan. All the declivities of the hills to the top, except those which are too steep, are formed into terraces or beds of different width, according to the slope, and these terraces are cultivated with the utmost care. Here, as in China, the greatest attention is paid to the collection of manure. The raising of rice is the principal object, but wheat, barley, and rye are also cultivated, though to a much smaller extent. Indian corn is not enumerated by Thunberg among the grain-crops of Japan. As the Japanese use no butter nor tallow, they cultivate *Rhus succedaneum*, *Sesamum*, and *Brassica orientalis*; the oil from the two last serves for dressing victuals, and that of the first is used for their lamps. The seeds of *Panicum verticillatum*, *Holcus sorghum*, or millet, *Panicum Corvi*, and *Cynosurus Coracanus*, are much used as food for man and beast, and cultivated extensively in some districts. Of esculent roots chiefly batatas and potatoes are raised. Other vegetables are turnips, cabbages, carrots, radishes, lettuces, melons, pumpkins, cucumbers, and gourds. Different kinds of beans and peas are raised in astonishing abundance, and several provinces have obtained a name from producing them in superior quality. Among the beans are the dadsu beans (*Dolichos Soja*), from which the Japanese make that liquid which is known in England under the name of soy. The plantations of the tea shrub are extensive in some districts, but their produce is inferior to that of China, and does not make an article for exportation. Ginger is cultivated, and the pepper shrub is planted for the consumption of the country. Their orchards are stocked with the fruit-trees of southern Europe, as oranges, lemons, medlars, figs, grapes, pomegranates; and they produce also chesnuts, walnuts, pears, peaches, and cherries; apples are not mentioned by Thunberg. The raising of cotton and silk are objects of great importance, and the *Broussonetia papyrifera* is planted extensively, its bark being used for making cloth and paper. Hemp is also much cultivated, but only employed in making cloth; the cordage is made from different kinds of nettles. Besides these different plants they plant the varnish-tree (*Rhus vernix*), from which they make the excellent varnish for their furniture, the cedar (*Cupressus Japonica*), the bamboo-cane, and the camphor-tree (*Laurus camphora*), though all these trees are also found in a wild state. They extract a blue dye-stuff from three kinds of *Polygonum*, *chinense*, *barbatum*, and *aviculare*. The authority for this account of the botany of Japan is Thunberg, from whom we have also taken the technical botanical names.

The horses are of a middling size, but strong. The number is small, as horses are only used for the saddle and by the princes. Thunberg is of opinion that there are not as many horses kept in the whole empire as in one single town in Sweden. Horned cattle are still less numerous. The Japanese do not use either their flesh or their milk, and they are only kept for drawing carts or for ploughing such fields as lie almost constantly under water. Buffaloes are found only in some districts. Neither asses nor mules are mentioned by Thunberg, but he expressly observes that sheep and goats are not kept. Swine are only found at Nagasaki, where they have probably been introduced by the Chinese, as the Japanese do not eat them. Fowls, ducks, and geese are plentiful, but principally valued for their eggs, of which the Japanese are very fond. Of wild animals only hares are mentioned by Thunberg, but he states, on the information obtained from the natives, that deer, bears, and other animals occur in the eastern and northern part of Nipon. Though the Japanese do not make much use of the flesh of domestic animals as food, they derive abundant provisions from the sea. Fish is extremely plentiful, and numerous villages are only inhabited by fishermen. Their rocky coasts are covered with oysters and several other kinds of shell-fish, and many families live exclusively on them. Even the flesh of the whale, of which some kinds are rather numerous along these coasts, is eaten.

Japan abounds in mineral wealth. Gold seems to be very plentiful in several provinces, but is not worked everywhere. The government seems to use corrective means to prevent such undertakings. Silver is not abundant; but copper, which contains a good deal of gold, is extensively worked, and supplies the most important article of export. Iron is said not to be common, but still there is enough for the consumption of the country. Some tin-mines are also stated to be worked. Salt in great quantity is made in several districts along the southern coast, where there exist salt-lagunes. Of other minerals only fine clay is mentioned, which is used in the manufacture of china; the porcelain is equal, if not superior, to that of China. The sea gives pearls and ambergris.

All travellers speak of the populousness of the country and the extent of the villages, which frequently occupy two English miles and more in length. In some more fertile districts they are so close to one another as to form nearly one contiguous street; as, for instance, in the plain which extends from the harbour of Osacca to Meaco. The smaller towns commonly contain five hundred houses, and the larger two thousand and upwards, and though they have generally only two stories they are occupied by a comparatively large number of persons.

1. The island of Kioosioo is extremely well cultivated, and generally fertile, with the exception of its eastern coast bordering on the Boongo Channel, which is mountainous, barren, and comparatively thinly inhabited. In several places there are considerable manufactures of cotton cloth, silk goods, and paper. The best known towns of importance are Nagasaki, Sanga, and Kokoora.

Nagasaki, sometimes pronounced Nangasaki, the only place open to foreigners, lies on a peninsula formed by the deep bay of Omoora, in 32° 45′ N. lat. and 129° 15′ E. long. Its harbour is spacious and deep, extending in length about 4 miles, with an average width of more than a mile. At its entrance is the small island of Papenberg, where the water is 22 fathoms deep, but it grows shallower as it proceeds inward, so that opposite to the town it has only a depth of 4 fathoms; so far it runs north-east, it then turns north, and has less depth. The town is built on its eastern shores, in a narrow valley which runs eastward. It is three-quarters of a mile long and almost as broad, and enclosed by steep though not high hills. There are some good buildings in the town, as the palaces of the two governors, and those of some princes and noblemen of the empire, but especially the temples, which were 62 in number, within and without the town, in the time of Kämpfer (1692). There are some manufactures of gold and silver. The population may amount to 15,000 or 18,000 souls. It is one of the five imperial towns of the empire.

Sanga, situated on a fine and well watered plain at the northern extremity of the large bay of Simabarra, the capital of the fertile province of Fisen, is a very large and populous town, with canals and rivers running through its wide and regular streets. It has considerable manufactures.

Kokoora, built near the entrance of the Strait of Simonoseki, has a shallow harbour, but carries on a considerable trade. The town, which in the time of Kämpfer had much decreased, was found in a thriving state in 1775, by Thunberg.

II. The island of Sitkokf has not been visited by Europeans. According to a Japanese geographer, cited by Kämpfer, it contains many mountainous and barren districts, and less fertile tracts than the other large islands.

III. Nipon, or Nifon, which constitutes the main body and strength of the empire, is, as far as it has been seen by Europeans, well cultivated and fertile, with the exception of a few barren tracts of moderate extent. It contains the largest towns, and the manufactured articles produced in this island are considered the best. The most important towns visited by Europeans, along its southern side, are—

Simonoseki, built at the foot of a mountain, on the shore of the narrow strait which bears its name, and which is only one mile and a half wide. It is not very large, but it carries on a very active coasting trade with all the districts to the east of it.

Muru, opposite to the north-eastern coast of Sitkokf, is not large, consisting only of about 600 houses; but its harbour is very safe, being well defended by a mountain running out westward from the mainland, for which reason it is resorted to by the coasting vessels, of which frequently more than 100 are anchored there. It is noted for its tanneries, where horse-hides are tanned in the manner of the Russian leather.

Osacca, one of the five imperial towns, and the most commercial place in the empire, is situated in the northern angle of the Gulf of Osacca, on the banks of the river Yedogawa, which, near the town, divides into three branches, and, before it falls into the sea, into several more. The middle or principal branch of the river, though narrow, is deep and navigable. From its mouths, as far up as the town and higher, there are seldom less than a thousand barges going up and down. Several navigable canals, which derive their water from the river, traverse the principal streets of the town, and serve as means for conveyance of goods. The banks of the river and of the canals are of freestone, coarsely hewn, and formed into ten or more steps, so as to resemble one continued staircase. Numerous bridges, built of cedar-wood, are laid over the river and canals; some of them are of large dimensions, and beautifully ornamented. The streets are narrow but regular, and cut each other at right angles; though not paved, they are very clean. A narrow pavement of flat stones runs along the houses for the convenience of foot-passengers. The houses are not above two stories high, and built of wood, lime, and clay. At the north-eastern extremity of the city is a large castle. The population is very great. According to the exaggerated accounts of the Japanese an army of 80,000 men may be raised from among its inhabitants. Many of the residents are very wealthy men, especially the merchants, artists, and manufacturers. The Japanese themselves call Osacca the universal theatre of pleasure and diversion; and plays are daily exhibited in public and private houses. In its neighbourhood the best saki, a kind of strong beer obtained from rice, is made, and exported into the other provinces.

South of Osacca, on the shores of the same gulf, is the town of Sakai, an imperial town, which however has never been visited by Europeans.

Meaco, or Kio, the residence of the ecclesiastical emperor, or Daïri, is about 20 miles from Osacca, and contained, in the time of Kämpfer, according to a census, more than 500,000 inhabitants, besides the numerous court of the Daïri. It is nearly four miles long and three wide. The Daïri resides on the northern side of the city, in a particular ward, consisting of 12 or 13 streets, and separated from the city by walls and ditches. On the western part of the town is a strong castle, built of freestone, where the Kubo, or secular emperor, resides when he comes to visit the Daïri. The streets are narrow, but regular, and always greatly crowded. The houses are like those at Osacca. Meaco is the principal manufacturing town of the empire, where every kind of manufacture is carried to the greatest perfection. Nearly every house has a shop, and the quantity of goods which they contain is astonishing; at the same time it is the centre of science and literature, and the principal place where books are printed; it is also the residence of the lord-chief-justice of the empire, who is invested by the emperor with supreme authority over all officers of government. The town is united by a wide canal to the river Yedogawa, which flows not far from its walls.

Kwano and Mia are two very considerable and thriving towns on the Gulf of Mia, each containing 2000 or 3000 houses, and carrying on a considerable trade with the neighbouring districts.

Yedo, the capital of the empire, is situated at the northern extremity of the gulf of the same name, in an extensive plain. According to the Japanese it is about ten miles long, seven wide, and is nearly 30 miles in circuit. All travellers agree that it is the largest and most populous town in the empire, but no one of them ventures to state the probable number of its inhabitants. A large river runs through the town and sends off a considerable arm, which encloses the imperial palace, or that of the Kubo, or secular emperor. There are several good bridges over the river. The principal is called Niponbas, or the Bridge of Japan, and from it the mile-stones are counted, which are erected along the principal roads that traverse the empire. Yedo is not so regularly built as Meaco, and the private houses do not differ from those of Osacca; but as the families of all the hereditary princes, lords, and noblemen are obliged to reside at the court the whole year round, the town contains a great number of fine palaces, though they are not above one story high. Rows of trees are planted along the numerous canals which traverse the town, to prevent the fires from spreading, which are very common. Yedo is not less famous for its manufactured goods than Meaco. The palace of the Kubo is built in the middle of the town. It consists of five palaces or castles, and some large gardens behind it, and is more than eight miles in circumference.

IV. The island of Yeso is very imperfectly known. On its western coast are high mountains. Its eastern and southern coast seem to be very thickly inhabited. Near the Strait of Sangar are two considerable towns, Kokodade and Matsmaï. The latter is the capital, and the residence of the governor.

The Japanese are not so strong as Europeans; but they are well made and have stout limbs. Their eyes show their Mongol origin, not being round, but oblong, small, and deeply sunk in the head. Their hair is black, thick, and shining, and their noses, although not flat, are rather thick and short. Their complexion is yellowish. They seem to resemble most the inhabitants of Corea, and the Aïnos on the island of Tarakai; but, according to appearances, they have derived their civilization from China. In manufacturing industry and in scientific knowledge they seem to be nearly equal to the Chinese, and in some articles the Japanese are superior. The Chinese themselves value the real Japan ware above their own inferior manufactures in lacker. Their manufactures in metals, silk, cotton, china, glass, and paper, and their cabinet-work, are highly esteemed. They also make excellent watches and clocks, and a late traveller (Meylan) mentions telescopes and thermometers. The fine arts are much admired, but the Japanese taste differs from ours, and is like that of the Chinese. The most antient religion is that of the Sinto, who was the offspring of the sun, the founder of the antient royal family and of the empire. But the greater part of the inhabitants have embraced Buddhism, which seems to have been introduced from Corea at a very remote epoch. Besides these two religions, a considerable number adhere to the doctrines of Confucius, the Chinese philosopher, and are called Syooto. In the seventeenth century the Roman Catholic religion was introduced by the Portuguese, and made great progress, but it was eradicated by a civil war and great persecutions, and entirely forbidden. All travellers who have been acquainted with both nations prefer the Japanese to the Chinese. They find them less cowardly, proud, cunning, and deceitful, and of a more manly and open character. In cleanliness and industry both nations are equal. The Japanese show a great desire for knowledge, and their institutions for instructing the lower classes seem not to be inferior to any on the globe. Indigence and pauperism are said to be almost unknown.

The government is despotic, but the emperor himself is considered as subject to the laws, which are of long standing and cannot easily be changed. Formerly, the Daïri Soma, the head of the Sinto religion, was the only sovereign of the empire; but as the public offices are hereditary, the chief general acquired gradually such an authority, that in 1585 he deprived the Daïri of his influence, leaving him only the supreme administration of ecclesiastical affairs; still however no enactment has legal force without having been previously sanctioned by the signature of the Daïri. The descendants of the chief general now govern the empire

under the title of Kubo Soma. The constitution of the Japanese empire is materially different from that of the Chinese in its hereditary nobility, dignitaries, and officers. The government of the provinces resembles in some respect the antient feudal system of Europe. The nobility, or hereditary governors of the provinces and districts, are called *Daimio*, or High-named, and *Siomio*, or Well-named. The first-mentioned govern the provinces, and the Siomio govern the districts. Six months of the year these noblemen are in their provinces to watch over their government, and six others they must pass at Yedo, but their families must remain in that town the whole year round as a security for the loyal conduct of the governors. According to Meylan, the population of the country is divided into eight classes—the princes or governors, the nobility, priests, military, civil officers, merchants, artisans, and labourers, by which we suppose agriculturists are meant. All these dignities, offices, and employments are hereditary; a circumstance which tends to keep society quiet, though it may also prevent some improvement.

The Japanese females have almost as much liberty as European females; most of them can play on a musical instrument which is like a guitar.

The inland trade is very considerable. The coasting trade is much favoured by the great number of small harbours, and the interior communication by well-planned and well-maintained roads, which are always thronged with carriages and people. Most of the roads are wide, and ornamented with lines of trees. The foreign commerce is limited to the Dutch and Chinese. The Dutch have a factory on the island of Desima, which is connected with the town of Nagasaki by a bridge. To prevent all communication with the inhabitants, it is planked on all sides, and has only two gates, one towards the town and the other towards the harbour. These gates are strictly guarded during the day, and locked at night In this inclosure are the storehouses, the hospital, and some houses built of wood and clay and covered with tiles. Only one ship is at present annually sent from the island of Java; it arrives in June and returns toward the end of the year. The Japanese export principally copper, camphor, and lacquered wood-work; with some china, silk-stuffs, rice, saki, and soy. The principal articles of importation are sugar, elephants' tusks, tin and lead, bar-iron, fine chintzes, Dutch cloths, shalloons, silks, cloves, and tortoiseshell; with some saffron, Venice treacle, Spanish liquorice, watches, spectacles, and looking-glasses. The Japanese copper does not reach the European market, being disposed of on the coast of Coromandel to great advantage.

The Chinese, like the Dutch, are shut up in a small island, but they are permitted to visit a temple in the town of Nagasaki; their trade is much more extensive. About seventy junks arrive annually from the ports of Amoy, Ningpo, and Shanghae, but as the Chinese have no factory they cannot remain during the winter in the harbour of Nagasaki. The Chinese junks arrive at three different times in summer

In the time of Kämpfer there was still some trade carried on with Corea and the Lew-Chew Islands, but this trade had ceased at the time of Thunberg (1775), and Siebold (1830) confirms this fact.

(*Ambassades Memorables*, &c., by Jacob van Meurs; Kämpfer's *History of Japan*: Charlevoix, *Histoire et Description générale du Japan*; Thunberg's *Travels in Europe, Africa, and Asia*; *Adventures of Captain Golownin*; Siebold's *Japan*; Extracts from Fischer and Meylan; *Journal of Education*, vols. vi., p. 370, x., p. 184.)

JAPANNING. Japanning is the art of producing a highly varnished surface on wood, metal, or other hard substance, sometimes of one colour only, but more commonly figured and ornamented. The process has received its name from that of the island of Japan, whence articles so varnished were first brought to Europe; though the manufacture is also extensively practised by the Chinese, Siamese, Burmese, and other nations of the extreme east of Asia, among whom it was suggested most probably by the possession of a tree, which affords with little preparation a beautiful varnish, exceedingly well adapted for the purpose, and which hardens better than those prepared in Europe.

The appearance of japanned work is as various as the taste and fancy of the artists employed in it. Sometimes it is a plain black or red, with a gilded or painted border; or it is an imitation of marble, of fine grained or rare wood, or of tortoiseshell; sometimes a drawing, in which high finish, brilliant colour, and showy patterns are more sought than good design; and occasionally fine copperplate engravings are applied to a japanned surface with good effect. In all cases the work is highly polished and varnished.

Japanning is applied to ladies' work-boxes and work-tables, to toilet-boxes, cabinets, tea-caddies, fire-screens, tea-trays, bread-baskets, snuffers and trays, candlesticks, and a variety of other articles. A good deal of common wood-painting is also called japanning, which differs from the more ordinary painter's work chiefly by using turpentine instead of oil to mix the colours with. Bedsteads, dressing-tables, wash-hand-stands, bed-room chairs, and similar articles of furniture are done in this way.

Three processes are usually required in japanning; laying the ground, painting, and finishing. In addition to these processes, whenever the matter to be japanned is not sufficiently smooth to receive the varnish, or when it is too soft or coarse, it is sometimes prepared or primed before any of the proper japanning processes are applied. It must here be observed, that almost every workman has his own peculiar modes of working, and his own receipts for making and mixing his varnishes; and that consequently only a very general idea can be given of the way in which the various operations are performed.

The preparatory mixture or priming is composed of size and chalk; the size is usually made of the ordinary carpenter's glue, which is well mixed up with as much chalk or whiting as will serve to give it a body sufficient to cover the colour and grain of the wood on which it is laid; it is put on with a brush like paint, and when perfectly dry, which will require a day or two, according to the state of the atmosphere, it must be brought to an even surface by rubbing with rushes, and then be smoothed by a wet rag. The best japanners disapprove of the use of priming, because its brittleness is very detrimental to the firmness of the varnishes laid over it; they use no substances which are of themselves unfit for receiving a varnish, or which they are unable to bring to a sufficiently smooth surface. For wood hard and fine enough to receive a varnish without priming, and for metals, paper, and leather, the only preparation necessary is a coat or two of varnish. In all these processes it is a rule to allow a day or two to intervene after every operation, that the work may be thoroughly dry.

When the work is prepared, the ground must be laid on; this is either all of one colour, or marbled, or done in imitation of tortoiseshell. The grounds are the ordinary pigments mixed with varnish, which are laid on smoothly with a brush: when thoroughly dry they are varnished, and afterwards polished by rubbing with a rag and tripoli or rotten stone; and, if the ground be white, with putty or starch and oil. The varnish used is either copal, or else it is composed of seed lac, or of gums animi and mastic; the lac varnish is considered by many workmen the best and hardest, but it is unfortunately too highly coloured for some of the more delicate grounds, to which it communicates a yellowish tinge; from this defect the gum varnish is free, but it is deficient in hardness; occasionally a mixture of the two is used, and some workmen prefer copal varnish to either gum or lac.

The mode of laying the grounds varies greatly; the old works on japanning are tediously minute in describing the various processes to be followed, detailing the number of times each coat should be laid on, and how long an interval should be allowed to elapse after each; and different proportions of colour and varnish are fixed as necessary to be used in each different operation. The mode now generally followed is to lay on one or two thick coats of colour mixed with varnish, then to varnish three or four times, and afterwards to dry the work thoroughly in a stove. The colours are flake-white or white-lead, Prussian-blue, vermillion, Indian-red, king's-yellow, verdigris, and lamp-black; intermediate tints are made by mixtures of these: an imitation of tortoiseshell is produced by vermillion, and a varnish of linseed-oil and umber. When a particularly gorgeous appearance is desired, the ground may be laid entirely in gold. This is produced by going over the work with japanner's gold size, which, when dry enough to bear touching with the finger, but still soft and clammy, is covered with gold-dust, applied on a piece of soft wash-leather. Any other metallic dust may be laid on in the same way. Many receipts are given for preparing the japanner's gold size, but nearly all agree in making linseed-oil and gum animi the

basis of the composition. A curious and very striking mode of laying the ground, called the dip, was formerly much practised; it was done by dropping small quantities of coloured varnish in a trough of water, over the surface of which it immediately spread in curious and often beautiful ramifications; into these the article was dipped; the colour was thus transferred to the work, and when dried was varnished and polished in the usual manner.

The work when thoroughly dry will now be ready for painting. The performer of this part of the process is rather an artist than a workman, though, as before stated, showyness and brilliancy are chiefly required in japanning, and bright colours with gold and bronze dust are largely employed. The colours are tempered with oil or varnish, and the metallic powders laid on with gold size. Copper-plate engravings or wood-cuts may also be executed in japan work; in this process the engraving is first printed off upon fine paper which has been previously prepared by a thick coat of isinglass or gum-water: when the print is perfectly dry, it is applied with its face downwards upon the japan ground covered with a thin coat of copal varnish; the paper is then moistened on the back with a sponge dipped in warm water, which in a few minutes dissolves the isinglass or gum, and the paper which is thus loosened is gently taken away, leaving the print on the work. Indian ink or other drawings upon paper may be transferred to the japanned ground in the same way. A more expeditious and very effectual mode of transferring an engraving is to print upon a smooth thick layer of a composition of glue, treacle, and whiting, which will receive an impression as perfectly as a sheet of paper: the composition, which is elastic and very flexible, may be immediately laid down upon the japanned surface, which will thus receive as goon an impression as if it could have been itself applied to the engraving.

In whatever manner the work has been painted or printed, or if all addition to the plain colour of the ground has been dispensed with, nothing now remains but the finishing. This is a very simple process: the workman chooses one of the before-named varnishes, and passes it over the work with a brush several times, until he judges the coating to be thick enough to bear the polish. It is an important precaution not to begin the varnishing until the preceding work is thoroughly dry, and to dry perfectly each coat before laying on a succeeding one. A hot stove is used in the best establishments to aid in drying the work. When thick enough, the varnish is polished by rubbing it with a rag dipped in finely-powdered tripoli or rotten-stone; towards the end of the operation a little oil is also applied to the rag, and the work is completed by rubbing with oil alone, to clear off the powder or any other impurity.

JAROSLAW. [YAROSLAW.]

JASHER, BOOK OF (ספר הישר), or 'the book of the upright,' is twice referred to in the Old Testament as a work of authority. (*Josh.* x. 13; 2 *Sam.* i. 18.) Many conjectures have been formed concerning the author and contents of this book; but we have no means of arriving at any satisfactory determination on the subject, since the work appears to have been lost before the time of the Babylonish captivity. Some critics have imagined it to be the same work as the book of Judges, which is evidently incorrect from the quotation in the book of Samuel; others, such as Bishop Lowth and Gesenius, have maintained that it was a collection of national songs.

In the year 1751, a printer of the name of Ilive published a pretended translation of the book of Jasher, which was said to have been translated from the original Hebrew by Alcuin of Britain. This work was republished at Bristol in 1829. An interesting account of this literary forgery is given in Horne's 'Introduction to the Scriptures,' vol. ii., part ii., pp. 132-138.

JASMINA'CEÆ, a natural order of Monopetalous exogens, deriving its name from the Jasminum, which forms one of its genera. It is one of the very few orders of that class with regular diandrous flowers, and is only to be mistaken for Oleaceæ, which have a valvate corolla, and which otherwise are scarcely different. Only four genera of this order have yet been discovered, the principal being Jasminum itself, which consists of a larger number of species, sometimes fragrant, sometimes scentless, erect or twining, inhabiting the hot or temperate regions of Europe, Africa, and Asia, including New Holland, but hardly known in America. The order is characterized by having opposite or alternate, simple or compound, exstipulate leaves; monopetalous flowers, the segments of whose corolla are imbricated, and seldom correspond with those of the calyx: 2 stamens, and a superior 2-celled few-seeded ovary. The species are chiefly valued for their fragrance; a few species have been regarded as bitter and astringent.



Jasminum officinale

1 a longitudinal section of the corolla, 2, a longitudinal section of the ovary and calyx.

JASON. [ARGONAUTS.]

JASON. [THESSALY.]

JASPER. [SILICIUM.]

JASSA, a genus of Amphipodous Crustaceans, established by Dr. Leach.

The general characters resemble those of *Corophium*, Latr.; but differ from them as well as from those of *Podocerus*, Leach, in the considerable size of the *hands* of the four first feet, which are oval; those of the second pair being the greatest, and armed with teeth more or less numerous on the internal border. *Eyes* not projecting.

Dr. Leach records two species, one, *Jassa pulchella*, from the south coast of Cornwall, where it was found in the middle of sea-weed; the other, *Jassa pelagica*, found near the Bell Rock, Scotland.

JASSY. [MOLDAVIA.]

JATROPHA, a genus of plants inhabiting the tropical parts of the world and belonging to the natural order Euphorbiaceæ. It contains among its numerous species the Jatropha or Jampha Manihot, a Brazilian and Guayana plant, whose fæcula forms a well known nutritious substance, called *Cassava*, when prepared in one manner, and *Tapioca* in another state. This secretion is analogous to the meal in the Potato, the Yam, and the Batatas, but it is mixed naturally with a highly dangerous juice, which it is necessary to remove by washing and evaporating before the fæcula is fit for food. When properly prepared, this substance is extremely nutritious, and forms the principal part of the vegetable diet of the poorer classes in South America.

JAUM GHAUT. [HINDUSTAN, p. 212.]

JAUNDICE (from *jaune*, yellow) is the name given to those diseases in which the excretion of the bile being prevented, it is retained in the blood, or reabsorbed, and being diffused throughout the system, gives a yellow colour to the skin, and all the other tissues and secretions.

The name is however very indefinite, because the cases in which the separation of the bile is prevented are various. Everything, for example, which obstructs the main trunk of the bile-ducts, as gall-stones [CALCULUS, BILIARY] or other foreign bodies filling its canal, certain morbid alterations of the liver or duodenum [INTESTINES], or of the duct itself, tumours and enlargements of adjacent organs, will alike mechanically produce jaundice, though their other symptoms differ widely. Again, it is often a symptom of inflammation of the liver, as especially in yellow fever, and of inflammation of the duodenum. But the most frequent cases are those which do not appear to be the consequence of any organic disease, but are accompanied by the

symptoms of general disorder of the digestive organs, as nausea or vomiting, thirst, and loss of appetite, confined or irregular condition of the bowels, headache, and general uneasiness. These cases generally come on suddenly, as a sequel of common diarrhœa, or in the dyspeptic and those of a sedentary habit, or whose bowels have been long inactive. It is often difficult to say what prevents the excretion of the bile; sometimes it is separated from the blood in too viscid a form; sometimes mucus appears to obstruct the duct; in many cases there is probably spasm of the duct, as in those which occur after violent fits of anger or other mental affection; and in some a larger quantity of bile appears to be formed than can be conveyed away with proportionate rapidity.

It is impossible that any one mode of treatment should be adopted for a symptom depending on such varied causes. Where the obstruction is mechanical, the jaundice is of course curable only by the removal of its evident cause; and in inflammation of the liver it is but a symptom of a more important disease, to which the treatment must be directed. In the more common cases, which, as distinguished from these, are sometimes called functional, the treatment should consist chiefly of small doses of mercury, and active purgatives containing calomel or neutral salts. Warm baths and opium should be used, if there be any spasmodic pain of the right side: and leeches or bleeding, if any inflammatory pain or tenderness be felt. A mild diet and the avoidance of all stimulant drinks or food should be carefully enjoined.

JAVA, one of the Greater Sunda Islands, the third in extent, but the first in importance, is situated between 5° 52′ and 8° 4′ S. lat., and between 105° 11′ and 114° 13′ E. long. On the south and west it is bounded by the Indian Ocean. The north-western corner of the island forms with the most southern extremity of the island of Sumatra the Straits of Sunda, which at one place are only fourteen miles across, and unite the Indian Ocean with the Java Sea. The last-mentioned part of the Indian Ocean washes the northern shores of Java, and at the south-eastern extremity of the island it is again united with the ocean by the Strait of Bali, which in the narrowest part is only two miles wide. The length of Java from Java Head on the west to East Point (Oost Hoek) is 666 miles; its breadth varies from 56 to 135 miles. The area is estimated at 50,000 square miles, or about that of England.

The island of Madura is commonly included in Java, from the north-eastern part of which it is divided by the Strait of Madura, which in one part is only one mile broad. Madura is 91 miles long, and 31 miles wide in the widest part.

Surface and Soil.—The southern coast in its whole extent is high and steep, rising in many places perpendicularly to an elevation of 80 or 100 feet, and in some places much higher. It runs in a continuous line, with few indentations, and those not deep. Consequently there are few places which have good anchorage, and as it is exposed to the open ocean, and to a high swell or surf, it is not much visited by shipping. Still a few good harbours occur; the best are Chelachap, about 109° E. long., and Pachitan, about 111° E. long.

The hilly country which is contiguous to the southern coast rises rapidly as we advance inland, and probably attains towards the middle of the island a mean elevation of more than 1000 feet, where it extends in elevated plains with an uneven or hilly surface. This hilly country does not extend over the whole breadth of the island, except at the western extremity as far east as Bantam, and in the peninsula, which comprehends the most eastern districts east of 112° 30′. This elevated region is traversed by numerous ridges of hills, probably rising to 2000 or 2500 feet above the sea-level, and running mostly in the direction of the island's length. On these ridges a considerable number of peaks rise to a great elevation. It is stated by Raffles that there are thirty-eight of such peaks. They have all a broad base, and gradually diminish in size to the summit, which has always the form of a cone. They are all volcanic. Indications and products of their former eruptions are numerous and unequivocal. The craters of several are completely obliterated; those of others contain small apertures which continually discharge vapours and smoke. Many of them have had eruptions during the present century, which have caused great loss of property and life.

The highest and most remarkable of these volcanic peaks are the Pangerango, south of Buitenzorg, more than 8000 feet high; Mount Gede, south-east of the former, rising to 9888 feet; the Dshirmai, south-south-west of Cheribon, more than 8000 feet high; the Gede Tegal, near 109° long., which probably attains between 11,000 and 12,000 feet; and Mounts Sindoro and Sumbing, called the Two Brothers, near 110° long. Three large volcanoes, called Ung'árang, Merbidu, and Merápá, lie in a direction almost south and north across the hilly region near 110° 30′ E. long. Near the eastern peninsula is the Arjúna, 10,614 feet high, and south-east of it, not far from the Indian Ocean, the Smeero, or Semiru, probably the most elevated of these peaks. At the north-eastern extremity of the island near Cape Sedano is the elevated volcano of Telágawurung.

The hilly region contains some extensive plains and valleys of great fertility, enclosed by the ridges of hills which connect the peaks. The largest of these elevated plains is that of Bandung, which seems to occupy nearly the whole tract from Mount Gede on the west to Mount Gede Tegal on the east. It is of great fertility, though somewhat inferior to the two valleys which lie contiguous to it on the east—the Vale of Banyumas, traversed by the beautiful river of Serayu, and the Vale of Kedù, on the banks of the river Elo. East of the last-mentioned vale is the elevated plain of Solo, which extends round the town of Sura-kerta, and exhibits a great degree of fertility. The elevated plain of Kediri, traversed by 112° long., is equally extensive and fertile. The eastern peninsula, whose surface is mostly occupied by peaks and high ridges connecting them, has only narrow and close valleys.

The elevated and hilly region terminates to the north in rather a steep slope, and between it and the Java Sea extends a flat country which descends imperceptibly from the foot of the hills to the very shores, where it terminates in some places in swamps. This low tract, which is mostly alluvial, is widest towards the west, and occupies nearly one-fourth of the width of the island, or about 40 miles, between Bantam on the west and Cheribon on the east. Between Cheribon and Samárang it is hardly more than 10 miles wide. This portion of the low lands is not equal in fertility to the inland districts. In Samárang are the flats of Demák, which extend between the elevated region and the mountains of Japára; they were once an extensive swamp, and are hardly inferior in fertility to any part of the island. East of these flats and between the same mountains are the low lands of Jipang and Surabáya, which terminate on the strait and gulf of Madura with the delta of the Surabaya river; the delta is also distinguished by its fertility. The low lands of Demak, Jipang, and Surabaya divide the mountains of Japara and some lower ridges from the elevated regions. The mountains of Japara, which contain a peak of considerable elevation, occupy the peninsula of Japara, on which the low coast-tract is very narrow. This isolated mountain system is separated by a deep valley, covered with alluvial soil, from a low ridge which occupies the whole tract of the coast between Cape Lerang and Cape Panha, and perhaps 10 or 15 miles inland.

The northern coast is lined by numerous small islands, and is marked by many projecting points and headlands. Accordingly the harbours are numerous. But the whole coastline affords anchorage at nearly all seasons of the year, and vessels of any burden can approach all the principal stations at a convenient distance for the exchange of their merchandise. The sea being generally smooth and the weather moderate, the native vessels and small craft always find sufficient shelter at the change of the monsoon by running under some island, or passing up the rivers, which though in general difficult of entrance on account of their bars, are for the most part navigable for such vessels as far up as the maritime towns.

The soil of Java is generally deep and rich. The best soils are the alluvial soils along the beds of the rivers, and on the slopes of the largest mountains; the worst are on the declivities of the lower ranges. But though there are these varieties, the general character of the soil is that of extraordinary fertility. The eastern districts however are superior to the western. The neighbouring countries, especially Sumatra and the Malayan peninsula, cannot be compared with Java in this respect. The best soils annually produce two crops without manure, and even the poorest remunerate the labour of the husbandman.

Rivers.—Java is watered by numerous rivers, but few of them have a considerable course on account of the compa-

rative narrowness of the island. There may probably be fifty streams, which in the wet season bear down rafts loaded with timber and other rough produce of the country. Five or six are navigable at all times to a distance of some miles from the coast. The rest, in number many hundreds, if not thousands, are used to irrigate the fields.

The Solo River rises with many branches near the southern coast in the mountains of Damong, and runs northward to Sura-kerta, where it is a stream of considerable depth and breadth; it afterwards turns to the east, and at Awi it is joined by the Madion. From this point to its mouth its course is calm, regular, and steady. It enters the Strait of Madura by two mouths at Gresek and Sidayu. From Sura-kerta to Gresek it is stated to run 356 miles, measured along the windings of the river, though in a straight line the distance is only 140 miles. In this part of its course there is no impediment to navigation. During the rainy season it is navigated by boats of considerable size, and except in August, September, and October, and in seasons uncommonly dry, it floats down boats of middling or small size during the whole year, from a considerable distance above Sura-kerta.

The Kediri or Surabaya River forms nearly a circle, and its source and mouth are situated almost in the same latitude. It rises at the base of the volcano Arjúna, winds round Mount Kawi, and is a large river at Kediri. From this place its course is no longer interrupted by any impediment, and it bears boats of a very considerable size to its outlets in the Strait of Madura. Its mouths are five in number, and they include a pretty extensive and very fertile delta.

There are no lakes in Java, but some low lands are converted into temporary swamps during the rains. Two of these swamps are of considerable extent; one called the Binnen See, at the foot of the Japára Mountains, and another not far from Samárang.

Climate.—In Java, as in other countries between the tropics, the year is divided into a wet and a dry season, and these seasons depend on the periodical winds. The setting-in of these winds is not determined within a few weeks; but generally the westerly winds, which are always attended with rain, commence in October, become more steady in November and December, and gradually abate, till in March or April they are succeeded by the easterly winds and fair weather, which continue for the remaining half year. The heaviest rains fall in December and January, and the driest weather is in July and August. Yet even during the rainy season there are many days without showers; and although the rains sometimes continue for several days, and frequently fall in torrents, they are not marked by that decided character, either of permanence or violence, which distinguishes the periodical rains on the continent of India. The same may be said of the dry season. Even in July and August the atmosphere is refreshed by occasional showers. The degree of heat varies considerably in the low lands and the hilly region. On the low northern shores at Batavia, Samárang, and Surabaya, the mean annual heat is 78°; but in the dry season the thermometer rises as high as 90°, and even higher about three o'clock in the afternoon. Usually however it ranges between 70° and 74° in the evenings and mornings, and attains 83° or 85° in the afternoon. The elevation of the interior offers the rare advantage that, from the sea-shore to the top of the mountains, there is almost, from one end of the island to the other, a regular diminution of temperature, at the rate of two or three degrees of Fahrenheit for every ten miles. The mean heat on the elevated plains probably does not exceed 66° or 68°, and the thermometer rarely rises there to 72°. On the summits of the peaks it sinks below the freezing-point: ice as thick as a Spanish dollar has been found, and hoar-frost, called by the natives 'the poisonous dew,' has been observed on the trees and vegetation of the higher regions. Hurricanes are unknown. With the exception of a few days at the change of the monsoons, or when the westerly winds are at their height, vessels of any description may ride in safety in most of the bays along the northern coast; and on shore the wind is never so violent as to do damage. Thunder-storms are frequent and destructive. Earthquakes are common in the vicinity of the volcanoes, but the European towns have not suffered from them. Java was formerly considered one of the most unhealthy countries of the globe, and this character is certainly due to the greatest portion of the low coast along the Java Sea; but on examination it has been found that by far the greatest part of the island, in point of salubrity, is equal, if not superior, to any other tropical country.

Productions; Vegetables.—Though not equal to the Hindus in agriculture, the Javanese are far superior to their immediate neighbours of the other islands. They are well acquainted with the cultivation of rice and other grains on the slopes of the mountains and hills, which are formed into terraces. They know likewise the advantages of a careful irrigation, and in some parts they grow, in the wet part of the year, a crop of rice, and in the dry part some species of pulse, farinaceous root, or cotton. In the richer lands however it is usual to take from them without interruption a double harvest during every twelve months. Rice is here, as in India, the principal object of the husbandman, and its produce determines the value of the land. Maize, or Indian corn, is not very extensively grown, but of late years its cultivation has much increased. In rich lands it returns four or five hundred-fold; and even in poor lands it yields sixty or seventy fold. Wheat has been introduced by the Dutch, and is cultivated on the more elevated lands, but its produce is in small quantity and of inferior quality. Millet is grown in some places on a limited scale. Among the many esculent roots cultivated the principal are the yam, the sweet potato, the Java potato, arrowroot, and the common potato. The last is only grown in the more elevated and colder districts, where also artichokes, cabbages, and peas succeed, but carrots not so well. The Javanese also cultivate cucumbers, onions, and capsicums. As they do not use butter, they consume a great quantity of different kinds of oil, made from the fruit of the cocoa-nut tree, the ground-nut (*Arachis hypogæa*), the Palma Christi, and the Sesamum, all of which are cultivated with considerable care. They also plant the Areca palm, on account of its nuts, and the Gomuto palm, partly on account of the toddy, or palm-wine, obtained from it, and partly on account of a substance resembling black horse-hair, which forms between the trunk and branches, and is used for every kind of cordage, domestic and naval: of late years it has been much used in European vessels. From its pith a kind of flour may be made, not unlike sago, but of inferior quality. There are also extensive plantations of the betel and of tobacco: and of fruit trees especially the following are cultivated: the plantain or banana (*Musa Paradisiaca*), the bread-fruit tree (*Artocarpus incisa*), the jack-tree (*Artocarpus integrifolia*), the mangustin (*Garcinia mangostana*), the durian (*Durio Zibethinus*), the mango (*Mangifera Indica*), different kinds of the orange and lemon tribe, especially the shaddock (*Citrus decumana*), the pine apple (*Bromelia ananas*), the Jamba (*Eugenia*), the Guava (*Psidium pomiferum*), the papaya (*Carica papaja*), the custard-apple (*Anona squamosa* and *reticulata*), and the cashew-nut (*Anacardium occidentale*). Besides these the pomegranate (*Punica granatum*) and the tamarind (*Tamarindus Indica*) are grown. European fruit-trees have not succeeded: the grape is cultivated in several places; but it is seldom of a good quality. The culture of the pear, the apple, and the peach has been still more unsuccessful.

The plants which afford articles for foreign exportation are the coffee-tree, the sugar-cane, the pepper-vine (*Piper nigrum*), the cardamom (*Amomum cardamomum*), ginger, the sandal-tree (*Santalum*), and the cotton-plant. The forests, which cover a part of the elevated region, especially in the eastern districts, contain a great number of teak-trees, whose timber is considered inferior to that of Malabar, but superior to that of the Birman empire. Ebony-wood is also found, and among their creeping plants are the rattan (*Calamus Rotang*, L.), and two species of caoutchouc trees.

As dye-stuffs there are cultivated indigo (*Indigofera tinctoria*), safflower (*Carthamus tinctorius*), arnotto (*Bixa orellana*), and turmeric (*Curcuma longa*, L.). Several fruit-trees produce dye-woods, as the sappan (*Cæsalpinia sappan*), the mangkuda (*Morinda*), and the ubar, similar to the logwood of Honduras.

There are two trees in this island from which poison is extracted, the *antjar* and the *chetik*. The antjar, also called the *Bopon upas* (or the poisonous tree), is a high forest-tree, from whose outer bark poison is extracted in the form of a milk-white sap. But its exhalations are not poisonous, nor is it, as was formerly supposed, hurtful to plants around it, creepers and parasitical plants being found winding in abundance about its trunks and branches. (Crawfurd.)

Animals.—There are no elephants, camels, or asses. The horses are of a small breed, but strong, fleet, and well made. Buffaloes are numerous, and of greater use in agriculture than any other animal. Black cattle are common, but much more so in the central and eastern districts than in the western. Goats are abundant, but sheep are scarce; both are of small size. The hog is reared chiefly by the Chinese.

Of beasts of prey there are the tiger, the leopard, the tiger-cat, and the jackal. Other wild animals are the rhinoceros, the wild Java ox, the wild hog, and the stag, as Raffles calls it, which is perhaps the axis deer.

Of domestic birds there are turkeys, geese near the settlements of the Europeans, ducks, fowls, and pigeons. Among the wild birds the most remarkable is the *hirundo esculenta*, whose nests are eaten, and exported in large quantities to the Chinese market. They are called Salanganests.

The cayman is abundant in the rivers of Java, but, according to Raffles, the animal much more resembles the crocodile of Egypt than the alligator of America. This crocodile is mentioned by Thunberg and by Mandelslo, the latter of whom says that it was eaten by the natives. Of serpents there are said to be several poisonous varieties. Turtle and fish are abundant. Honey and wax are also obtained. Silkworms were once introduced by the Dutch, but this branch of industry did not extend among the natives.

Minerals.—Few minerals are known to exist in Java Iron is said to be found in small quantity, and indications of gold have been observed at several places. Salt is made of sea-water in some parts of the northern coast. Saltpetre is extracted from the earth of some caves, and sulphur is found near the volcanoes.

Political Divisions, Towns, &c.—The greatest part of the island is in possession of the Dutch. The districts situated on both extremities of the island, as well as the whole of the northern coast, are immediately subject to them. But the southern coast and the adjacent countries, between 108° 30′ and 112° 20′ E. long, with the exception of the small district of Pachitan, which has been recently ceded to the European government, is subject to two native princes, the Susuhúnan, or emperor, and the sultan. Their dominions extend more than 250 miles along the southern coast, and form about one-fourth of the whole island.

1. The Dutch possessions are divided into 17 provinces. The country west of 108° 30′ comprehends five of them, Bantam, Batavia, Buitenzorg, the Preanger districts, and Cheribon. The low and alluvial parts along the coast are of considerable fertility, but large tracts in the mountain-ranges still remain in a state of nature, and where the ground has been cleared of forests they are now overgrown with long and rank grass. The elevated plain of Bandung however is well cultivated and peopled. The Preanger districts are governed by native hereditary princes, who pay a tribute to the Dutch. The most considerable and remarkable towns in this country are on or near the northern shores Sirang, or Ceram, where the governor of Bantam resides, is a thriving place some miles inland, and distant from the antient town of Bantam, which has been abandoned. Batavia, which once had a population of 160,000 souls, contained in 1834 not more than 53,861 inhabitants, having been partly abandoned on account of its unhealthiness. [BATAVIA.] But its suburbs, situated at some distance and on a higher level, have received a great part of the population. Of these suburbs Molenvliet is built in the Dutch fashion along a wide canal, and is mostly inhabited by Europeans; Ryswick, the seat of the general governor, contains a fine palace and beautiful square, called the Royal Place; Weltefreden, is the central point of the military force, with extensive barracks; and Noordwyck is inhabited by the merchants and people in trade. Cheribon is a thriving town, with a good roadstead and 10,000 inhabitants; it contains a beautiful mosque. In the interior of the country is Buitenzorg, a thriving and well-built village, 40 miles from Batavia and at the foot of the volcano of Pangerango. It contains the summer palace of the governor-general and many fine country-houses. A navigable canal unites it to the harbour of Batavia. The most considerable town in the Preanger districts is Chanjur.

The Dutch possessions east of 108° 30′ to the Strait of Madura contain the nine provinces of Tegal and Brebes, Pakalongan, Kedú, Samárang, Japara, Rembang, Gresek, and Surabaya. They constitute the most fertile part of the Dutch dominions, and contain the Vale of Kedú, the flats of Demák, and the Plain of Surabaya. The chief towns from west to east are the following:—Samárang, with more than 30,000 inhabitants, has an extensive commerce. Foreign vessels are permitted to trade to it. There is a military academy. Rembang has 8000 inhabitants and some trade. Surabaya is situated on the Straits of Madura, which form an excellent and spacious harbour with good anchorage, and secure against the violence of the sea and wind. It is the most populous and thriving town of Java, and its population exceeded 80,000 souls in 1815. Its harbour is open to foreign vessels. In the interior, in the Vale of Kedú, are the extensive and admired ruins of the temples of Boro Bodor.

The eastern peninsula, which extends to the Strait of Bali, is less fertile than any part of the island, being almost entirely occupied by mountains. It contains three provinces, Passaruan, Besuki, and Banyuwangi, of which the last is noted for its coffee, which is stated to be superior to that of Mocha, and for the great quantity of sulphur which abounds here. Passaruan is a small town on the sea-coast.

2. The dominions of the Susuhúnan, which contain a population of nearly one million, consist of two separate tracts. The largest lies between 108° 30′ and 110° E. long., and contains the fertile vale of Banyumas, with the town of the same name, which has 8000 inhabitants. From this the smaller portion is separated by the Vale of Kedú and some territories of the Sultan. It lies in the interior of the island, between 110° 30′ and 111° 20′ E. long., and contains the residence of the Susuhúnan, called Sura-kerta, on the Solo River, which has a population of 105,000 souls.

3. The territories of the Sultan extend between 110° and 112° 20′ E long., and contain nearly 700,000 inhabitants. In their eastern districts is the fertile plain of Kediri. The capital is Yugya-kerta, a town with 90,000 inhabitants. In its vicinity are the ruins of Brambanan, called Chandi Sewu, or the Thousand Temples. [BRAMBANAN.]

Inhabitants.—The natives of Java belong to the widely spread race of the Malays. They are short, thick-set, and robust. Crawfurd thinks that their medium height is about four inches less than the average stature of Europeans. Their lower limbs are rather large and heavy, but not ill formed; their arms are rather fleshy than muscular. The face is of a round form, the mouth wide, the teeth remarkably fine, the chin rather of a square form, the cheek-bones are high and the cheek consequently rather hollow. The nose is short and small, never prominent, but never flat; the eyes are small and always black. The complexion is generally brown, and darker than in the neighbouring islands. The hair is long, lank, harsh, and always black. They have very little beard. The Javanese are Mohammedans, but the creed of the Arabian prophet, which was introduced among them in the fourteenth century, has been much modified by the doctrines and ceremonies of Buddhism. Three different dialects of the Malay language are spoken on the island, but they have also an antient sacred language called Kawi, which contains a great number of Sanscrit words. The Javanese have a native literature, which however is not rich. They have also translations from the Sanscrit and Arabic; the latter are small in number and solely on subjects of religion and jurisprudence. In civilization the Javanese are much superior to all other nations who inhabit the Indian Archipelago. This is evidently shown by the state of their agriculture, though it cannot be compared with that of the Hindus or Chinese. In the art of fishing they are very expert, like all the other nations of this part of Asia. They do not eat their fish in a fresh state; it is almost always salted or dried. A peculiar preparation, called by the Malays *blachang*, and by the Javanese *trasi*, is a mass composed of small fish, chiefly prawns, which is fermented and dried in the sun. It is used as a universal sauce, more generally than soy with the Japanese; and as soon as Europeans have overcome their repugnance to it, they become as partial to it as the natives. In no kind of manufacture are the Javanese distinguished, except in working gold. Their cotton-cloth is coarse, but of a substantial and durable texture; a small quantity is exported. The raw silk, imported from China, is manufactured into a rich thick tissue, more distinguished how ever by the quantity of material which it contains, than by the beauty of the workmanship. The Javanese show also considerable skill in the construction of their vessels and boats, of which there is a great variety.

The whole population of Java in 1815 consisted of 4,520,829 natives, and about 100,000 foreigners settled on the island. The foreigners are Chinese, Malays, Hindus, Arabian merchants, and slaves brought by the Europeans and Chinese from Bali and Celebes.

Commerce.—Java is extremely well adapted for an extensive commerce. The island itself is rich in productions, and its northern coasts, which are accessible to vessels all the year round, lie opposite the richest countries of Asia Besides this, the Dutch government has made it the centre of all the trade which Holland carries on with its extensive settlements in the Indian Archipelago. All the goods destined for consumption in the Moluccas, Celebes, Borneo, and the eastern coast of Sumatra, are sent to Batavia, and forwarded thence to the places of consumption. The exports of these countries, intended for the European and American market, are likewise sent to Java and thence to Europe. The trade of the island was always open to the independent Asiatic nations, and since its re-occupation by the Dutch the vessels of all European nations are admitted into the ports of Batavia, Samárang, and Surabáya.

The Dutch and other Europeans and the North Americans export from Java chiefly coffee, sugar, rice, pepper, and arrack; minor articles are, long pepper, cubeb pepper, ginger, turmeric, cajeput oil, tamarinds from Madura, sapan, rattans, and some hides and horns of buffaloes and oxen; also vessels built of teak, and teak timber. The imports are cotton fabrics, especially chintzes, white cottons, handkerchiefs, and velvets; woollen broad-cloth; iron, unwrought, Swedish and British; Swedish steel; some cutlery, nails, and small anchors; wrought copper, the unwrought copper being imported from Japan; some fire-arms and ammunition; glassware and earthenware; opium from Malwa and Turkey.

The Chinese chiefly visit the harbours of Batavia and Samárang, and their junks depart from the harbours of the provinces of Quantun, or Canton, Fokian, and Chekiang especially Canton, Amoy, Changhu, Tyanchu, Ningpo and Shanghae. Their importations, in the order of value, are black tea, coarse porcelain, wrought iron, principally in the form of pans for the sugar-houses, and other culinary vessels, cotton-cloth, raw and wrought silk, especially satins of various colours, with a few velvets and brocades, brass ware, paper, books, paint, shoes, fans, umbrellas, and toys. They take in return black pepper, long pepper, sandal wood, mostly imported from the island of Timor, betel-nut, bees'-wax, cotton, edible birds' nests, sharks' fins, rhinoceros horns and hides, ox and buffalo hides and horns, European woollens and cottons.

The inhabitants of the other islands of the Indian Archipelago carry on an active commerce with Java by means of the Bugis, or inhabitants of Boni, in Celebes. These active navigators and adventurers leave their country in the beginning of the eastern monsoon, and carry on a trading voyage as they proceed westward, until they reach the limit of their navigation at Malacca, Penang, and Achin, and prepare to return with the change of the monsoon. The commodities which they export from their own country and the islands which they visit before they arrive at Java are, the excellent and durable cotton-cloth of their native country, gold-dust, nutmegs, Spanish dollars, camphor, frankincense, and tortoiseshell. They take in return birds' nests, European and Indian cotton goods, unwrought iron, salt, rice, different kinds of pulse, and tobacco.

The inhabitants of Coromandel and Malabar bring to Java blue cotton-cloth, cotton chintzes, and tobacco; and take in return betel-nut, bees'-wax, black pepper, nutmegs, and mace, brought from the Moluccas, ivory and damar from Borneo and Sumatra, and tin from Banca.

A few vessels from Mocha in Arabia annually visit Java. They first go to Malabar and import cotton-cloths, fruits, and bullion: and take in return cloves and nutmeg, black pepper, betel-nut, rice, and sugar.

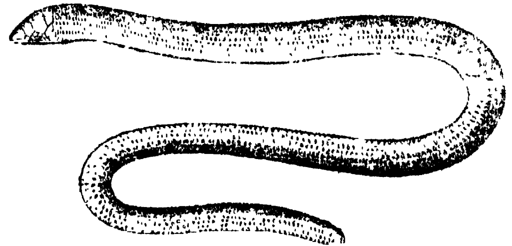
It is stated, that in 1825 the imports into Java amounted to about 1,140,000*l.*, and the exports to about 1,430,000*l.* The Dutch imported to the amount of about 200,000*l.*, and exported to the amount of about 688,000*l.* The British imported, partly from Bengal, to the amount of 155,000*l.*, and exported to the amount of 36,000*l.* Hamburg imported to the amount of 11,000*l.* The French imported to the amount of 14,000*l.*, and exported to the amount of 16,000*l.* Sweden imported to the amount of 1000*l.*, and exported to the amount of 9000*l.* The North Americans imported to the amount of 190,000*l.*, and exported to the amount of 34,400*l.* Merchandise to the amount of 4000*l.* was sent to Mocha in Arabia. The exports to China were estimated at 113,600*l.*, and the imports at a similar sum. From Java were sent to the other islands of the Indian Archipelago goods amounting to 379,000*l.*, and from these islands were imported others amounting to 344,000*l.*

History.—The Portuguese reached Java in 1511, and soon after began to form small settlements. The Dutch established themselves at Bantam in 1595, and in 1602 the English erected a factory at the same place, which was the first possession of the English in the East Indies. But the English as well as the Portuguese were soon obliged to give way to the Dutch, who built the town of Batavia, and by degrees enlarged their dominion, until they succeeded, about the middle of the last century, in dividing the empire of the Susuhúnan into two parts, and appropriating the greater portion of it to themselves. The two sovereigns became at the same time dependent on the Dutch government, and have since been obliged to sell to them, at fixed and low prices, considerable quantities of rice, pepper, sugar, and coffee. The Dutch also claim the right of confirming the successors of the sultans. When Holland was united to the empire of Bonaparte, the British took possession of the island in 1811, but restored it to the Dutch after the fall of Bonaparte in 1816.

(Stavorinus, *Voyages to the East Indies*: Raffles's *History of Java*: Crawfurd's *History of the Indian Archipelago*; Count Hogendorp's *Coup d'Œil sur Java, &c.*: *Description Géogr., Histor. et Commerciale, de Java et des autres Isles de l'Archipel Indien.*; *Ueber die Kawi Sprache auf der Insel Java, &c.*, von W. von Humboldt, Berlin, 1836.)

JAVELIN SNAKE. [ACONTIAS; BLIND-WORM, vol. iv., p. 529.]

The cut which illustrates *Acontias* appears to have been taken from Cuvier's reference (*Règne Animal*) to Seba, ii., xxi., 1, which is erroneous. In the plate of Seba quoted, No. 4 may pass for an *Acontias*, but No. 1 represents a totally different form.



Acontias Meleagris.

JAXT (now often written Jagst), one of the four circles into which the kingdom of Würtemberg is divided. It borders on the north-west on Baden, and on the north and east on Bavaria. It has an area of 2104 square miles, and a population of 355,691 inhabitants It is divided into 14 high bailiwicks. The chief town is Ellwangen. The principal rivers are the Jaxt, from which it has its name, the Kocher, and the Rems. The greater part of the possessions of the princes of the House of Hohenlohe is situated in this circle. This ancient House is descended from Eberhard, duke of Franconia, who died in 918, and was brother to King Conrad, and is named from the castle of Hohenlohe (Hollach, Hollo), the ruins of which are still to be seen at the village of Hollach near Uffenheim in Bavaria. The princes of Hohenlohe lost their sovereign rights on the dissolution of the German Empire and the formation of the Rhenish Confederation, and were declared vassals of the kings of Würtemberg and Bavaria. The House now consists of two principal lines, Hohenlohe Neuenstein and Hohenlohe Waldenburg. The first, which is Protestant, is divided into three branches: H. Langenburg, with a territory of 95 square miles and 16,800 inhabitants; 2. H. Oeringen (formerly Ingelfingen), with a territory of 130 square miles and 24,870 inh.; 3. H. Langenburg-Kirchberg, with a territory of 84 square miles and 15,400 inh. The second main line, which is of the Roman Catholic religion is likewise divided into three branches: Hohenlohe Waldenburg and Bartenstein, with a territory of 148 square miles and 23,000 inh.; 2. H. Bartenstein-Jaxtberg, with a territory of 135 square miles and 10,800 inh.: 3. H. Waldenburg-Schillingsfurst, with a territory of 125 square miles and 17,500 inhabitants

JAY. [CORVIDÆ, vol. viii., p. 69.]

JAYADE'VA, a celebrated Hindu poet. We possess hardly any particulars respecting the circumstances of his life. It appears from a passage in his poems that he was born at Kenduli; but the position of this town is very doubtful. Some commentators place it in Kalinga, others in Burdwan; but according to the popular tradition of the Vaishnavas, it was situate near the Ganges. (Wilson, in *As. Res.* xvi. 52.) If the verse at the end of the 'Gîta Govinda' is genuine, the name of Jayadeva's father was Bhojadeva, and that of his mother Râmâdevî. According to Sir William Jones, Jayadeva lived before Câlidâsâ (*As. Res.* iii. 183); but this is exceedingly improbable, both from the artificial construction of the verse and the whole tenor of the poem. Professor Wilson places Jayadeva in the 15th century of the Christian æra (*As. Res.* xvi. 37); but Lassen, with greater probability, supposes that he lived in the middle of the 12th century. (*Prolegomena* to the 'Gîta Govinda,' pp. iv. v.)

The only poem by Jayadeva which is extant is entitled 'Gîta Govinda;' that is, 'the poem in honour of Govinda,' one of the names of Krishna, the eighth *avatar*, or incarnation, of Vishnu. The poem is a kind of pastoral drama, in which the loves of Krishna and Râdha are described in a glowing and voluptuous manner. This poem has always been greatly admired among the Hindus; and the majority of Hindu commentators contend that it is not to be understood in a literal, but in a figurative and allegorical sense, and that the loves of Krishna and Râdha describe the 'reciprocal attraction between the divine goodness and the human soul.' Among the Europeans, Sir William Jones and Colebrooke admit this allegorical mode of interpretation (*As. Res.* iii. 183; x. 419); but we are inclined to believe that the 'Gîta Govinda,' like the poems of Hafiz, is in reality what it professes to be, merely an amatory poem; and that the allegorical mode of interpretation is the invention of commentators and scholiasts. The question has been very ably discussed by Lassen in his Prolegomena.

An English translation of the 'Gîta Govinda' was published by Sir William Jones in the third volume of the *As. Res.* The original text was printed very inaccurately at Calcutta in 1808; a new and very accurate edition, with notes, and a Latin translation, edited by Lassen, was published at Bonn, 1836.

JEAN I., a posthumous son of Louis X. *Hutin*, was born in 1316, and lived only eight days, but is numbered in the chronological order of kings. At his death his uncle and regent Philippe le Long assumed the title of Philippe V.

JEAN II., son of Philippe de Valois and of Jeanne of Burgundy, ascended the throne upon his father's death in 1350. At the beginning of his reign he caused Raoul, high constable of France, to be beheaded without trial, on a suspicion of treason, and he afterwards invited King Charles of Navarre, with whom he had some differences, to an interview at Rouen, and there arrested him and put to death several lords of his suite. The brother of the King of Navarre and the relatives of the murdered lords applied to Edward III. of England for assistance. In 1355, Edward sent his son the Black Prince into France at the head of an army. After ravaging several provinces the Black Prince was met by King Jean near Poitiers, who with 80,000 men attacked the English, 10,000 in number, on the 19th September, 1356: the French were completely defeated, and Jean, after displaying much personal bravery and being wounded, was taken prisoner and conducted to London, where he was received by King Edward with great honour. Negotiations followed: Edward offered to renounce his assumed claim to the French crown on condition of being acknowledged as absolute sovereign of Normandy, Guienne, Calais, and other lands which had been held in fief by the former kings of England. Jean wanted to gain time, but meanwhile his own country fell into a state of horrible anarchy. The citizens of Paris revolted against the Dauphin Charles, and drove him out of Paris, and soon after the peasants or serfs, so long oppressed and brutalized by the feudal nobility, broke out into insurrection, plundered and burnt the castles of the nobles, and massacred all within them, men, women and children, with circumstances of frightful atrocity. This servile war, called La Jacquerie, from Jacques Bon-homme, the nickname given in derision to the French peasantry, lasted during the years 1357 and 1358, until the Dauphin and other great lords, having collected their forces, fell upon the peasants and massacred them by thousands, without giving any quarter. In May, 1360, peace was concluded at Bretigny between France and England, Edward giving up his claims to Normandy and France, and assuming the title of sovereign Lord of Aquitaine, with the consent of the Dauphin, who promised to pay a large ransom for his father. Jean was then restored to liberty, but he found so great an opposition among his nobles to the fulfilment of the conditions of the treaty, and was perhaps also made so uncomfortable by the confusion and wretchedness which prevailed in France, that he resolved, to the great astonishment of his courtiers, to return to England, to confer with Edward upon what was to be done. On arriving in London he took up his old quarters in the Savoy, and was received in the most friendly manner by Edward. He soon after fell dangerously ill, and died in London, in April, 1364. He was succeeded in France by his son Charles V.

JEAN SANS PEUR. [BOURGOGNE.]

JEAN DE MONTFORT. [BRETAGNE.]

JEAN D'ANGELY, ST., a town in the west of France, capital of an arrondissement in the department of Charente Inférieure, in 45° 57′ N. lat. and 0° 31′ W. long.; 240 miles in a straight line south-west of Paris, or 288 miles by the road through Orléans, Tours, Poitiers and Niort.

This town is on the right bank of the Boutonne, an affluent of the Charente, which here becomes navigable. In the dark ages succeeding the downfal of the Western Empire, St. Jean d'Angély, called in the barbarous Latin of the time Angeriacum, was the residence of the Dukes of Aquitaine, who had a castle here. In the place of this castle, Pepin le Bref built a Benedictine monastery. In the religious wars of the sixteenth century, the town, then of considerable importance, was besieged by the Huguenots under Count La Rouchefoucauld, A.D. 1562; but though the majority of the inhabitants were of the Reformed faith, the siege was not successful. It fell however into the hands of the Huguenots some time after; and though retaken, A.D. 1570, by the Catholic army under the Duke of Anjou (afterwards Henri III.), came again into the hands of the Huguenots. In A.D. 1621 it was taken from them by Louis XIII., who demolished the walls, and deprived the townsmen of their municipal privileges.

This town appears to be declining. At the commencement of the present century the commune had 8000 inhabitants: in 1831 it had 6031 (of whom 5326 were in the town), and in 1836, 5915. The chief trade is in timber and brandy. There are a college, or high school, a seminary for the priesthood, an agricultural society, a theatre, and baths.

JEDBURGH. [ROXBURGHSHIRE.]

JEDO, or JEDDO. [JAPAN.]

JEFFERSON, THOMAS. From the American Revolution of 1776 we may date the commencement of that struggle which has agitated and still agitates Europe and the two Americas. By whatever words the character of this struggle may be expressed,—whether under the name of popular rights against exclusive privileges, or self-government or the government of the people, against absolute government or the government of a few, or by any other terms more or less appropriate,—the contest is still going on, openly and actively in those called free governments, silently and languidly in those where the sovereign power is opposed to the extension or introduction of the new doctrines. The contest is between progress (not here considered whether as right or wrong) and standing still; between change, without which there cannot be improvement, and a desire to resist all change, which can hardly end in keeping things stationary, but almost necessarily leads to a backward movement. The contest is not only for the practical application of principles in government, which are vigorously maintained by the one party, and either not denied or faintly opposed by the arguments of the other; but also for the free expression and publication of all opinions on all subjects affecting the moral and political condition of society.

There is no individual, either in America or in Europe, who by his actions and opinions has had a greater influence on this contest than Thomas Jefferson. During a long and laborious life, both in official situations, which gave him opportunities that his activity never let slip, and in private life, in his extensive correspondence and intercourse with persons of all countries, he constantly, perseveringly, and honestly maintained what he conceived to be the principles

of pure republican institutions. In the ardour of youth, his zeal and energy mainly contributed to animate his countrymen to declare their independence on a foreign power. In his maturer age, when a member of the General Administration, he struggled, and he struggled at one time almost alone, against a monarchical and aristocratical faction, to maintain the great principles of the Revolution, and develop the doctrines of a pure unmixed popular government. His influence gave to these doctrines a consistency, and a form, and a distinctness, which the mass of the nation could easily seize and retain. He thus became the head of a party in the United States, which, whether always rightly appealing to his doctrines or not for the vindication of their acts, still regards him as the father of their school and the expounder of their principles. By his plain and unaffected manners, and the freedom with which he expressed his opinions on all subjects, he gave a practical example of that republican simplicity which he cultivated, and of that free inquiry which he urged upon all. Such a man must always have many friends and many enemies. From his friends and admirers he has received, perhaps, not more praise than those who believe in the truth of his doctrines and the purity of his conduct are bound to bestow; by his enemies, both at home and abroad, he has been blackened by every term of abuse that bigotry, malice, and falsehood can invent.

Thomas Jefferson was born April 2, 1743, at Shadwell, now in the county of Albemarle, in Virginia. He was educated at the College of William and Mary, at Williamsburg, then the capital of the colony, where, under Dr. Small, a native of Scotland, who was professor of mathematics in the college, he studied mathematics, ethics, and other branches of knowledge. His education, owing to the care of this excellent instructor and his own industry, must have been of a superior kind. In addition to his general acquirements, he made himself well acquainted with the best Greek and Latin writers, and to the end of his long life retained his ability to read them. Mr. Jefferson studied law under Mr. Wythe, then a lawyer of eminence. He made his first appearance at the bar of the General Court in 1767, at the age of twenty-four, about two years after the misunderstanding between Great Britain and the Colonies had commenced. He practised for seven or eight years in the General Court, and was gradually rising to the first rank as an accurate and able lawyer, when he was called away to more important duties by the political events that preceded the American Revolution. In 1769 he was elected a member of the House of Burgesses for the county of Albemarle. In the session of this spring the House unanimously came to resolutions in opposition to those which had been lately passed in England by both houses of parliament on the affairs of Massachusetts. This measure, which was accompanied with the declaration that the right of laying taxes in Virginia was exclusively vested in its own legislature, and others of a like tendency, induced the governor, Lord Botetourt, abruptly to dissolve the Assembly. The next day the members met at the Raleigh Tavern, and entered into articles of agreement, by which they bound themselves not to import or purchase certain specified kinds of British merchandise, till the act of parliament for raising a revenue in America was repealed; and they recommended this agreement to be adopted by their constituents. Eighty-eight members signed the agreement, among whom were George Washington, Thomas Jefferson, and others, who afterwards took a distinguished part in public affairs.

In 1773, on the meeting of the Virginia Assembly in the spring, Mr. Jefferson was an active member in organizing the Standing Committee of Correspondence and Inquiry, the main objects of which were to procure early intelligence of the proceedings of the British parliament, and to maintain a constant communication among all the Colonies. On the dissolution of the Assembly, in May, 1774, by the governor, Lord Dunmore, eighty-nine members met at the Raleigh Tavern, and, among other things, recommended the Committee of Correspondence to communicate with the Committees in the other colonies 'on the expediency of appointing deputies for the several colonies of British America, to meet in General Congress, at such place annually as should be thought most convenient,' to consult on their common interests. It was also forthwith agreed that the members who might be elected under the writs at that time issuing in the colony of Virginia should meet in Convention at Williamsburg on the 1st of August following, in order to appoint delegates to the Congress, if such General Congress should be approved by the other colonies. The Convention did meet, and thus formed the first popular assembly in Virginia uncontrolled by governor or council. Mr. Jefferson, who was one of the deputies, prepared instructions for the delegates who might be sent to the Congress. Being prevented by illness from attending on this occasion, his instructions were laid on the table for perusal, and were generally approved, but thought too bold in the existing state of affairs. Still the Convention printed them, in the form of a pamphlet, under the title of 'A Summary View of the Rights of British America.' The Convention drew up another set of instructions, which, though not so strong as Mr. Jefferson's, expressed with great clearness the points at issue between the colonies and the mother-country, and the grievances of which the colonies had to complain. The General Congress, consisting of fifty-five members, met at Philadelphia, September 4, 1774. The disputes which had broken out between Lord Dunmore and the Assembly of Virginia were continually increased by fresh causes of mutual irritation; and the governor at last thought it prudent to remove himself and his family into a British ship of war which was lying at York in York River. His whole conduct during this period was feeble and contemptible. His last acts from his head-quarters at Norfolk were to annoy the inhabitants on the rivers and bays by a predatory kind of warfare, to proclaim martial law in the colony, and to give freedom to such of the slaves as would bear arms against their masters. At last, after setting fire to Norfolk, he was obliged to take refuge in his ships, and soon after to leave the country. Thus ended the colonial government in Virginia.

On the 21st June, 1775, Mr. Jefferson took his seat in the General Congress, as one of the delegates from Virginia, and was appointed one of a committee for preparing a declaration of the cause of taking up arms. A part of the address which he drew up was finally adopted, and no doubt greatly contributed to bring about the more decisive declaration of the following year. In 1776, Mr. Jefferson was again a delegate to Congress, and one of a committee appointed to draw up a declaration of independence. The committee was chosen in the usual way, by ballot, and as Mr. Jefferson had received the greatest number of votes, he was deputed by the other members to make the draught. Before it was shown to the committee, a few verbal alterations were made in it by Dr. Franklin and Mr. (afterwards President) Adams. After being curtailed about one-third, and receiving some slight alterations in the part retained, it was agreed to by the House, July 4, and signed by all the members present, except one. This instrument is too well known to require any remarks. It has both merits and defects; but it served the purpose for which it was intended, and its author had the satisfaction of seeing the mighty question between the mother-country and the colonies referred to the decision of the sword, the only alternative then left except unconditional submission.

Before their adjournment the Virginia Convention, July 5, had elected Mr. Jefferson a delegate to Congress for another year; but he declined the honour on various grounds, among which was his desire to assist in reforming the laws of Virginia, under the new constitution, which had just been adopted. Congress also marked their sense of his services by appointing him joint envoy to France, with Dr Franklin and Silas Deane; but domestic considerations induced him to decline this honour also.

From this time Mr. Jefferson's public life is interwoven with the history of his native State, and with that of the United States. During the war he took no part in military movements. He was governor of Virginia in part of 1779, 1780, and part of 1781, in which year the state suffered considerably from the incursions of Lord Cornwallis; and at the close of his period of office he narrowly escaped being taken prisoner by Colonel Tarleton in his own house at Monticello.

In May, 1784, Mr. Jefferson was appointed by Congress minister to France, where he remained five years, during which he was actively employed in promoting the general interests of his country, and in keeping up an extensive correspondence. His industry and methodical habits enabled him to devote a great deal of his time to the examination of everything that could in any way prove beneficial to his countrymen. His correspondence during this period shows the variety of his pursuits, his unwearied industry, and his unbounded zeal for every improvement

that could benefit the social condition of man. His remarks on the political troubles of France, of which he witnessed the beginning, are characterized by his usual closeness of observation, and by his sanguine anticipations of the benefit that would result from the people being called to participate in the exercise of the sovereign power. After all that has been written on the subject, they will still be read with interest.

He returned to America at the close of 1789, and early in the next year he was appointed secretary of state by the president, General Washington. He held this office till the end of 1793, when he resigned. From 1793 to 1797 he lived in retirement. In 1797 he was elected vice-president of the United States; and in 1801 was chosen president in place of Mr. Adams, by the House of Representatives, on whom the election devolved in consequence of the equal division of the electors' votes between Mr. Jefferson and Colonel Burr. He was elected a second time, and after fulfilling his term of eight years retired to his favourite residence at Monticello, near the centre of the state of Virginia.

On Mr. Jefferson's retirement from the presidency of the United States he received, in the form of a farewell address, the thanks of the General Assembly of his native State, February 9th, 1809. After briefly recapitulating the leading measures of his administration, most of which faction itself must allow were eminently calculated to promote the happiness of the nation and secure those republican principles on which the constitution was founded, the General Assembly conclude with bearing testimony to his unvarying singleness of purpose, from the days of his youth, when he resisted the governor Dunmore, to his retirement from the highest honours which the united nation could bestow. This address, which, in point of style, is more free from objection than most American productions of the same class, is such as few men on retiring from power have received, and it was offered for services which few have performed.

In this document, among the advantages for which the nation was indebted to Mr. Jefferson's administration, the acquisition of Louisiana, and with it the free navigation of the Mississippi, are not forgotten. Mr. Jefferson early saw the importance of the United States possessing this great outlet for the commerce of the Western states, and strongly urged it while he was secretary of state under General Washington. The object was accomplished in 1803, when Louisiana was purchased from the French for 15,000,000 dollars.

Mr. Jefferson himself thought that the most important service which he ever rendered to his country was his opposition to the federal party during the presidency of Mr. Adams, while he was himself vice-president of the United States. Himself in the Senate and Mr. Gallatin in the House of Representatives had alone to sustain the brunt of the battle, and to keep the republican party together. The re-action that ensued drove Mr. Adams from his office, and placed Mr. Jefferson there. Mr. Jefferson's administration was characterized by a zealous and unwearied activity in the promotion of all those measures which he believed to be for the general welfare. He never allowed considerations of relationship or friendship to bias him in the selection of proper persons for offices; he always found, as he says, that there were better men for every place than any of his own connexions.

The last years of his life, though spent in retirement, were not wasted in inactivity. He continued his habits of early rising and constant occupation: he maintained a very extensive correspondence with all parts of the world; received at his table a great number of visitors, and was actively engaged in the foundation and direction of the University of Virginia, which was established by the state of Virginia near the village of Charlottesville, a few miles from Monticello.

No person but Mr. Jefferson could have had influence enough to induce the legislature of Virginia to grant the necessary funds for the endowment of this university. Though often baffled, he finally succeeded, by the help of his friends in that body, in obtaining ample grants for the buildings, library, and the salaries of the professors. He planned the buildings himself, and superintended their erection; drew up with his own hand a well digested and copious catalogue of books for a library, a large part of which were purchased in Europe and ready for use when the university opened in 1825; and he went so far as to prevail with the visitors of the institution to send an agent to Europe to select four of the professors. This last circumstance would show that Mr. Jefferson did not cherish such an unreasonable hostility to Great Britain as his enemies have charged him with.

The last letter in Mr. Jefferson's published correspondence, and it is probably the last that he wrote, is in reply to Mr. Weightman of Washington on behalf of the citizens of Washington, who had invited Mr. Jefferson to the celebration of the fiftieth anniversary of American independence. His health would not permit him to accept the invitation. His reply is characteristic. The zeal for republican institutions which had animated him during a long life still glows warm and fresh in the letter of a man of the age of fourscore and three, suffering under a painful malady. His firm conviction in the truth of those principles which he had maintained through life appears stronger as he approaches the termination of his career. He died July 4th, 1826, the day of the celebration, just half a century after that on which the Declaration of Independence was signed. Mr. Adams died on the same day. Mr. Jefferson is buried in the grounds near his own house. A simple inscription, which was found among his papers after his death, recording him as the author of the Declaration of American Independence, of the Statute of Virginia for Religious Freedom, and Father of the University of Virginia, is placed on his tomb. The fact of his having been president of the United States is not mentioned.

The latter days of Mr. Jefferson were embittered by pecuniary difficulties, which were owing in some measure to the neglect of his estates during his long absence on the public service; and in a great degree to an obligation which he incurred to pay a friend's debts (see an excellent letter to Mr. Madison, February 17th, 1826).

In the 4th vol. of his Memoirs, &c., p. 439, are printed his 'Thoughts on Lotteries,' which were written at the time when he was making his application to the legislature of Virginia for permission to sell his property by lottery, in order to pay his debts and make some provision for his family. The general arguments in defence of lotteries are characterized by Mr. Jefferson's usual felicity of expression and ingenuity, and they are also in like manner pervaded by the fallacies which are involved in many of his political and moral speculations. But this paper has merits which entitle it to particular attention. It contains a brief recapitulation of his services: and is in fact the epitome of the life of a man who for sixty years was actively and usefully employed for his country. 'I came,' he says, 'of age in 1764, and was soon put into the nomination of justices of the county in which I live, and at the first election following I became one of its representatives in the legislature; I was thence sent to the old Congress; then employed two years with Mr. Pendleton and Wythe on the revisal and reduction to a single code of the whole body of the British Statutes, the acts of our Assembly, and certain parts of the common law; then elected governor; next to the legislature, and to Congress again; sent to Europe as minister plenipotentiary; appointed secretary of state to the new government; elected vice-president and president; and lastly, a visitor and rector of the university of Virginia. In these different offices, with scarcely any interval between them, I have been in the public service now sixty-one years, and during the far greater part of that time in foreign countries or in other states.'

This is the outline of Mr. Jefferson's public life; to fill it up would be to write the history of the United States, from the troubles which preceded the Declaration of Independence to Mr. Jefferson's retirement from the presidency in 1809.

The paper from which we have already made one extract presents us with his services in another point of view, still more interesting. It is an epitome of those great measures which were due mainly or entirely to his firm resolution, unwearied industry, and singleness of mind, in his pursuit of objects which he believed essential to the stability and happiness of his country.

'If legislative services are worth mentioning, and the stamp of liberality and equality, which was necessary to be impressed on our laws in the first crisis of our birth as a nation, was of any value, they will find that the leading and most important laws of that day were prepared by myself, and carried chiefly by my efforts; supported, indeed

by able and faithful coadjutors from the ranks of the House, very effective as seconds, but who would not have taken the field as leaders.

'The prohibition of the further importation of slaves was the first of these measures in time.

'This was followed by the abolition of entails, which broke up the hereditary and high-handed aristocracy, which, by accumulating immense masses of property in single lines of families, had divided our country into two distinct orders of nobles and plebeians.

'But further to complete the equality among our citizens, so essential to the maintenance of republican government, it was necessary to abolish the principle of primogeniture. I drew the law of descents, giving equal inheritance to sons and daughters, which made a part of the revised code.

'The attack on the establishment of a dominant religion was first made by myself. It could be carried at first only by a suspension of salaries for one year, by battling it again at the next session for another year, and so from year to year, until the public mind was ripened for the bill for establishing religious freedom, which I had prepared for the revised code also. This was at length established permanently, and by the efforts of Mr. Madison, being myself in Europe at the time that work was brought forward.

'To these particular services I think I might add the establishment of our university, as principally my work, acknowledging at the same time, as I do, the great assistance received from my able colleagues of the visitation. But my residence in the vicinity threw of course on me the chief burden of the enterprise, as well of the buildings as of the general organization and care of the whole. The effect of this institution on the future fame, fortune, and prosperity of our country can as yet be seen but at a distance. That institution is now qualified to raise its youth to an order of science unequalled in any other state; and this superiority will be the greater from the free range of mind encouraged there, and the restraint imposed at other seminaries by the shackles of a domineering hierarchy and a bigoted adhesion to antient habits.'

When Mr. Jefferson was a member of the colonial legislature, he made an effort for the emancipation of slaves; but all proposals of that kind, as well as for stopping the importation of slaves, were discouraged during the colonial government. The importation of slaves into Virginia, whether by sea or land, was stopped in 1778, in the third year of the Commonwealth, by a bill brought in by Mr. Jefferson, which passed without opposition, and, as Mr. Jefferson observes, 'stopped the increase of the evil by importation, leaving to future efforts its final eradication.'* The Act for the Abolition of Entails was not carried without some opposition, and that for the abolition of the Established Anglican Church was not finally carried till 1786, though before the Revolution the majority, or at least a large number, of the people had become dissenters from the church. The reason of the difficulty lay in the majority of the legislature being churchmen.

Mr. Jefferson married, in 1772, Martha Skelton, the widow of Bathurst Skelton. She died ten years after their marriage. One daughter, and a numerous family of grandchildren and great grandchildren, survived him.

He was the author of 'Notes on Virginia,' which have been several times printed; but his reputation as a writer rests on his official papers and correspondence, of which latter, we believe, that which is published forms only a part of what he left behind him. 'His letters,' as his biographer remarks, 'especially those of his latter years, are written with great elegance and felicity. They have all the ease of Addison, with far greater precision. His style is always natural, flowing, and perspicuous; rarely imaginative and never declamatory. It was occasionally marked by neologisms where he thought there were no apt words already in use. It was neither diffuse nor concise, but more inclined to the former.' 'As an author, he has left no memorial that is worthy of his genius; for the public papers drawn by him are admired rather for the patriotic spirit which dictated them than for the intellectual power which they exhibit. They presented no occasion for novelty of thought or argument or diction. His purpose was only to make a judicious and felicitous use of that which everybody knew and would assent to; and this object he has eminently fulfilled.' But one of his letters (Tucker's *Life of Jefferson*, ii., p. 384) is of itself enough to exalt him to the rank of a first-rate writer. In a few words, he has sketched the character of General Washington—with a fidelity which belongs only to intimate knowledge, with a sincerity and love of truth which ennoble himself no less than the subject of his eulogy, with a precision and a force unrivalled by any literary essay of this kind, and with that profound but well-tempered admiration and respect which are due to the memory of so wise, so good, and so great a man. Much has been said and conjectured as to the religious opinions of Mr. Jefferson, and his supposed infidelity has been the ground of much bitter attack on his character. In the latter part of his life he used to call himself a Unitarian, when questioned on the subject by any of his friends. Perhaps his published correspondence presents the best means of judging of his religious opinions. Though decidedly approving of the morality which the Gospel inculcates, it does not appear that he can be ranked among any particular class of believers. (Tucker's *Life of Jefferson*, 2 vols. London, 1837; Jefferson's *Memoirs, Correspondence*, &c., London, 1829; *Journal of Education*, No. VII., *On the University of Virginia*, by Professor Tucker. This notice is reprinted from the 'Gallery of Portraits,' with a few alterations and additions.)

JEFFERSONITE, a variety of Pyroxene. [PYROXENE.]

JEJU'NUM. [INTESTINES.]

JELLY. [FOOD.]

JENA, a town in the Grand-Duchy of Saxe-Weimar, is situated in a romantic valley, partly surrounded by steep naked mountains, at the conflux of the Leutra with the Saale, over which there is a stone bridge of nine arches: 50° 56′ N. lat., 11° 37′ E. long. It consists of the town, through which the Leutra flows, and of the suburbs. The ramparts and moats which formerly surrounded the town have nearly disappeared. Jena is the seat of the supreme court of appeal for the Saxon Duchies and the principality of Reuss, and of several learned societies. It is however chiefly celebrated for its university, which was founded at the suggestion of the Elector John Frederick, who passing through Jena in 1547, as a prisoner of the emperor Charles V. after the battle of Mühlberg, advised his three sons to make Jena the nurse of the sciences, and the preserver of the pure Protestant faith, instead of Wittenberg, of which he had been deprived. The advice was followed, and when the elector, having recovered his liberty, returned in 1552, a considerable number of students went out to meet him. It was not till after long negotiations that it obtained from the emperor Ferdinand I. all the rights and privileges of a university, and was solemnly opened as such on the 2nd of February, 1558. It has always been its chief boast that it has zealously endeavoured to take advantage of the new views which have been opened from time to time, especially in philosophy. This tendency is evident in the two literary journals, one established in 1785 by Schütz, and one in 1805 by Eichstädt. The celebration of the festival on the Wartburg, the foundation of the Burschenschaft, and the circumstance that Sand, the assassin of Kotzebue, had resided last at Jena, did much injury to the university. These matters have in time been looked upon in a less unfavourable light, and the prohibition to Prussian subjects to study at Jena, issued in 1819, was revoked in 1825. The princes of Saxe-Weimar have always encouraged the university, and in our times it has been much benefited by a reform of the statutes, both of the university and the several faculties, by new laws for the students, and a considerable addition to its funds. The salaries of the professors have been increased, and a philological, theological, and homiletic seminary founded. The university has a large library, and there are in connection with it a botanic garden, a veterinary school, a school of midwifery, an anatomical theatre, a clinical institution, a collection of physical and mathematical instruments, a cabinet of minerals, an observatory, &c. There are 18 regular and 15 extraordinary professors, and several private teachers, making in all above 50. The number of students in 1837 was 569. The population of the town, exclusive of the university, is 5792. Jena has acquired additional celebrity in our times from the disastrous battle fought in its vicinity on the 14th of October, 1806, between the Prussian army under the Duke of Brunswick, and the French under Napoleon, in which the former was totally defeated and the duke mortally wounded. The consequences of the battle were even more fatal to Prussia than the battle itself,

* Act in Hening's 'Statutes at Large,' vol. ix., p. 471. Act declaring tenants of lands, or slaves in taille, to hold the same in fee simple. Hening, ix., p. 226.

and ended in the complete subjugation and humiliation of the kingdom. Jena and its environs suffered considerably, and what is now called the Eichenplatz was the site of 28 houses which were burnt on that occasion.

JENESEI. [SIBERIA.]

JENISEISK. [SIBERIA.]

JENNER, EDWARD, M.D., was born in 1749, at Berkeley, in Gloucestershire, of which his father was vicar. He was educated at Cirencester, and apprenticed to Mr. Ludlow, a surgeon at Sudbury. At the conclusion of his apprenticeship he went to London, and became a pupil of John Hunter, with whom he resided for two years while studying medicine at St. George's Hospital, and with whom his philosophical habits of mind and his love of natural history procured him an intimate and lasting friendship. In 1773 he returned to his native village, and practised as a surgeon and apothecary till 1792, when he determined to confine himself to medicine, and obtained the degree of M.D. at St. Andrew's University.

But the history of Jenner's professional life is embodied in that of vaccination. While at Sudbury he was surprised one day at hearing a countrywoman say that she could not take the smallpox because she had had cowpox; and upon inquiry he learned that it was a popular notion in that district, that milkers who had been infected with a peculiar eruption which sometimes occurred on the udder of the cow were completely secure against the smallpox. The medical men of the district told him that the security which it gave was not perfect; they had long known the opinion, and it had been communicated to Sir George Baker, but he neglected it as a popular error. Jenner during his pupilage repeatedly mentioned the facts, which had from the first made a deep impression on him, to John Hunter, but even he disregarded them; and all to whom the subject was broached either slighted or ridiculed it. Jenner however still pursued it; he found, when in practice at Berkeley, that there were some persons to whom it was impossible to give smallpox by inoculation, and that all these had had cowpox; but that there were others who had had cowpox, and who yet received smallpox. This, after much labour, led him to the discovery that the cow was subject to a variety of eruptions, of which one only had the power of guarding from smallpox, and that this (which he called the true cowpox) could be effectually communicated to the milkers at only one period of its course.

It was about 1780 that the idea first struck him that it might be possible to propagate the cowpox, and with it the security from smallpox, first from the cow to the human body, and thence from one person to another. In 1788 he carried a drawing of the casual disease, as seen on the hands of milkers, to London, and showed it to Hunter, Cline, and others; but still none would either assist or encourage him; scepticism or ridicule met him everywhere, and it was not till 1796 that he made the decisive experiment. On the 14th of May (a day still commemorated by an annual festival at Berlin) a boy aged eight years was vaccinated with matter taken from the hands of a milkmaid; he passed through the disorder in a satisfactory manner, and was inoculated for smallpox on the 1st of July following without the least effect. Jenner then entered on an extensive series of experiments of the same kind, and in 1798 published his first memoir, 'An Enquiry into the Causes and Effects of the Variolæ Vaccinæ.' It excited the greatest interest, for the evidence in it seemed conclusive; yet the practice met with opposition as severe as it was unfair, and its success seemed uncertain till a year had passed, when upwards of seventy of the principal physicians and surgeons in London signed a declaration of their entire confidence in it. An attempt was then made to deprive Jenner of the merit of his discovery, but it signally failed, and scientific honours were bestowed upon him from all quarters. Nothing however could induce him to leave his native village, and all his correspondence shows that the purest benevolence, rather than ambition, had been the motive which actuated all his labours. 'Shall I,' he says in a letter to a friend, 'who, even in the morning of my life, sought the lowly and sequestered paths of life, the valley and not the mountain—shall I, now my evening is fast approaching, hold myself up as an object for fortune and for fame? My fortune, with what flows in from my profession, is amply sufficient to gratify my wishes.' Till the last day of his life, which terminated suddenly in 1823, he was occupied in the most anxious labours to diffuse the advantages of his discovery both at home and abroad; and he had the satisfaction of knowing that vaccination had even then shed its blessings over every civilized nation of the world, prolonging life, and preventing the ravages of the most terrible scourge to which the human race was subject.

Jenner's other works all evince the same patient and philosophical spirit which led him to his great discovery. The chief of them was a paper 'On the Natural History of the Cuckoo,' in which he first described that bird's habit of laying its eggs singly in the nests of smaller species, to whom it leaves the office of incubation and of rearing the young one, which, when a few days old, acquires the sole possession of the nest by the expulsion of its rightful occupants. Indeed he gained so much credit by this paper, that he was recommended not to send his account of vaccination to the same Society, lest it should injure the scientific reputation which he had already obtained.

The life of Jenner has been written by his friend Dr. Baron of Gloucester, in 2 vols. 8vo. Five medals have been struck in his honour, of which three were produced in Germany, and a statue is erected to him in his native county. But it is remarkable that the only public testimonials awarded by his country to the man whose unaided intellect and industry have added more years to the lives of men than the united labours of any century, were grants of 10,000*l.* and 20,000*l.*, which were voted to him by the House of Commons in 1802 and 1807.

JENYE. [HINDUSTAN, p. 216.]

JENYNS, SOAME, born 1704, died 1787, enjoyed a considerable reputation in his lifetime from the happy accident of uniting good birth and fortune with a creditable share of literary accomplishment and success. His family property was at Bottisham, near Cambridge; he was educated at St. John's College; elected M.P. for the county in 1741; for the borough of Dunwich in 1754; for the town of Cambridge in 1761, which last he represented until his withdrawal from public life. In 1755 he was made a lord of trade, and he held that office in spite of political changes until its abolition in 1780, being a steady supporter of all existing administrations. As a versifier he is elegant and sprightly; sometimes rather free: his poems, which consist of 'The Art of Dancing,' 1728, and 'Miscellanies,' 1770, have found admission into the 2nd and 3rd editions of Johnson's Poets. His prose works are:—1. 'A free Inquiry into the Nature and Origin of Evil,' 1756. This unsatisfactory attempt to solve one of the most difficult of moral problems was very ably and severely criticised by Dr. Johnson in the 'Literary Magazine,' and this rebuke Jenyns seems never to have forgiven. (See Boswell's *Life*, under the above year.) 2. 'View of the Internal Evidence of the Christian Religion,' 1776, for the divine origin of which he argues from its utter variance with the principles of human reason. This was a curious ground for a friend to take; and though the book obtained much praise, there were many also who regarded it as the work of a disguised enemy. This does not seem to have been the case; Jenyns, though once a sceptic, was in the latter part of his life a professed, and, as Boswell, who was no friend to him, believed, a sincere Christian. 3. Dissertations on various subjects, 1782. These are political and religious. His prose writings have obtained much praise for elegance of style, art, shrewdness of remark, and aptness of illustration; but his talent was better suited for the lighter and more showy parts of literature than for metaphysics and controversial theology. He published some pieces not here mentioned. His Works are collected in 4 vols. 8vo., 1790-3, with a Life, by Mr. Cole.

JER-FALCON, or GYR-FALCON, the English name of the *Falco Islandicus* of Latham, *Gerfaut* of the French, *Hebog chwyldro* of the Antient British. [FALCONIDÆ, vol. x., p. 182.]

JERBOA. [MURIDÆ.]

JEREMIAH (Heb. יִרְמְיָהוּ; LXX. Ἱερεμίας), one of the prophets of Judah, the writer of the greater part of the book in the Hebrew canon which bears his name, and of the whole of the book, succeeding it in that canon, called 'The Lamentations.'

He was of the sacerdotal family, being the son of Hilkiah, a priest, whose residence was at Anathoth in the land of Benjamin, about three miles north of Jerusalem. This we learn from the general title to his book of Prophecies (chap. i., ver. 1), and that title sets distinctly before us the

period through which he flourished. He was called to the prophetic office, being then in his youth, in the thirteenth year of King Josiah, which, according to the received chronology, was 629 years before the Christian æra commences. He continued in the prophetic office till the eleventh year of King Zedekiah, that is, till 588 B.C. Nearly all the prophecies collected in this book were delivered by him in those reigns, and in the intermediate reigns of Jehoahaz, Jehoiakim, and Jehoiachin, the unhappy family of Josiah. He consequently witnessed the death of Josiah, who was slain in battle by the king of Egypt, the deposition of Jehoahaz, and the two great invasions of the kingdom of Judah by Nebuchadnezzar, king of Babylon, who in the first carried away Jehoiachin and many of the people captive, and in the second carried away still more, with Zedekiah the king, whose eyes he caused to be put out when he had slain his sons and many of his nobles in his presence. Then it was that ensued the burning of the king's palace and of the temple which had been erected by Solomon, and of the whole city of Jerusalem, in that fatal fifth month and seventh day of the month which was long remembered in the calendar of Jewish calamities.

These things saw Jeremiah; and in the midst of all this scene of misery his voice was often raised, as one of the prophets of Jehovah, to deplore the calamities which fell upon his country, or with the voice of warning to call his countrymen to depart from the offences which had provoked those sufferings, and to turn themselves to God, both in outward observances and in inward purity and conformity of heart.

His contemporaries in the prophetic office were in the earlier periods Zephaniah and Habakkuk, and in the latter his æra approaches near to that of Ezekiel and Daniel.

The book entitled his Prophecies is a collection of such prophecies or exhortations as he delivered at various times, mingled with relations of historical events. The last chapter, the fifty-second, is wholly historical, and is supposed to have been written by some other person, not improbably Ezra, and to be intended as a kind of introduction to the book of Lamentations which follows it. But the most remarkable circumstance relating to the composition of the book is this, that the various prophecies are put together without any regard to the order of time in which they were delivered. At the beginning indeed we have the account of his call to the prophetic office, but as we proceed we soon find that we have prophecies delivered in the reign of Jehoiakim following others which were delivered many years after in the reign of Zedekiah.

However, this does not lead to any serious inconvenience or occasion any important difficulty, as we are generally informed in whose reign and at what time the several distinct prophecies were delivered. They are very easily distributed in the chronological order by any one who is desirous to do so, and thus to obtain a more distinct idea of the object of the prophet, and the relation of these compositions to the time at which he lived; and on this account we omit the chronological arrangement of the several prophecies, either as following Dr. Blayney, or the German critic Rosenmüller, or proposing any other of our own. Those who desire to read the Scriptures with understanding can have no more agreeable and profitable exercise than thus to refer the writings of the prophets to the period of Jewish history to which they belong, and to observe how suitable they are to the then state of the people of God, and to the character which the prophets sustained among them.

The tone in which Jeremiah addressed the people was frequently disapproved by the political authorities of the time. He appears to have been an ever-faithful witness to the Most High, and to have sought to support his honour as well in the good days of King Josiah as in the evil days of his degenerate sons. In the later reigns it was said that he dispirited the people, and that they were rendered by him less energetic in the resistance which they offered to the armies of Chaldæa. This led to his being placed under restraint and punished.

Hitherto our remarks have been confined to the first forty-two chapters and to the fifty-second, the last. But when we arrive at the forty-third chapter we find a new and very important circumstance in the life of Jeremiah. In neither the first nor the second captivity was Jeremiah carried away with his countrymen and king to Babylon: he still remained in Judæa, lamenting her fallen and desolate state, and exhorting and encouraging the remnant of the people to continue in the land till they should be forcibly expelled. This was distasteful to a powerful party, who thought they saw in Egypt a safe place of retreat from the power of the king of Babylon, and who finally led the people that remained into that country, carrying Jeremiah with them. They settled at a place called Taphanhes, which is probably the Daphnæ of the Greek geographers. The forty-fourth chapter is an exhortation which he delivered to his countrymen in Egypt. But in the forty-fifth chapter we are carried back to the times of King Jehoiakim; so little of order and regularity is there in the making up of this book. After this there follow various predictive discourses delivered by Jeremiah at various and uncertain periods concerning other nations, the Egyptians, Philistines, Moabites, Ammonites, Edomites, and others, ending with an awful denunciation against Babylon, in which the utter desolation of that great and flourishing city is predicted, and the return of the people from their long captivity. The prophecy of the utter abolition of Babylon, so that its site should become a place for the abode of wild beasts of the desert, is very remarkable.

The sacred books contain no later information concerning the prophet than that he was among those who went to Taphanhes. But some of the early Christian writers relate of him that he was stoned to death by his countrymen in Egypt for preaching against their idolatry.

Two very different accounts are given of the occasion on which he wrote the book of Lamentations. The old opinion, after Josephus, was that it was written on the death of King Josiah: but the later and more probable opinion is that it is a bewailing of the lost state of Judæa when it had suffered so dreadfully from the armies of Nebuchadnezzar. It is a very tender and pathetic poem, consisting of five portions, or, as they may be considered, distinct elegies. The structure is very artificial, the successive stanzas in each of the elegies beginning with the letters of the alphabet taken in order. Some of the Psalms are also in their structure of this form.

Some persons have imagined that they see in the style of Jeremiah proofs of original rusticity. There are not the dignity and splendour of Isaiah, but there are great beauties peculiar to this prophet, whose province appears rather to be the expression of grief and concern than of glowing indignation.

JERICHO. [SYRIA.]

JERICHO, ROSE OF, is the popular name of a plant called by botanists Anastatica Hierochuntica. It is a native of Palestine and other parts of the East, and, when alive, is a small inconspicuous annual, with branches regularly spreading round the centre. When it dies, these branches curl up so as to form a sort of ball, and, the root decaying, are blown about in the dry weather which succeeds their short-lived growing season. If at that time they are placed in a wet situation, their hygrometrical properties cause them to unfold, and to assume something the appearance of a rose, a simple phenomenon to which the people of the East have attached the fable that the plant first blossomed at the moment when our Saviour was born, and that now, if put into water when labour commences, it will indicate by its expansion the progress of parturition, and will finally expand when the child is born. The Jews call it Kaf Maryam, or St. Mary's Flower.

JEROME, SAINT, one of the Fathers of the Church, and accounted the most learned of all the Latin Fathers. He was well acquainted with both the Greek and Hebrew languages.

His æra was from A.D. 340, about which time he was born, to A.D. 420, in which year he died. He was a native of Pannonia, but came early to Rome, where he studied under the grammarian Donatus. When he had received baptism in token of his professing the Christian faith, he entered upon a long course of travel. He visited Gaul, where he remained some time, and afterwards travelled in Thrace, Pontus, Bithynia, Galatia, and Cappadocia. When he was about thirty he began to be noted for his theological knowledge. In a retirement which he had chosen for himself in Syria he was disturbed on a suspicion of the want of perfect soundness in the faith. This determined him to go to Jerusalem, and there apply himself to the study of the Hebrew language as the best means of enabling him to understand the Scriptures rightly, not only of the Old, but also of the New Testament. In A.D. 382 he returned to Rome, having spent some time at Constantinople on his

way, where at that time lived St. Gregory of Nazianzus, a celebrated preacher. At Rome he became secretary to Pope Damasus. There appear to be circumstances in the life of Jerome at this period which are not cleared up. It is however certain that Sericius, the successor of Damasus, had not the same esteem for him which Damasus had, and that Jerome left Rome and returned to the neighbourhood of Jerusalem. There he took up his abode in a monastery at Bethlehem.

In this retirement he employed himself in writing on the questions wh ch then divided the opinions of Christians, and here it is believed he died, at the age of eighty years.

Many of the writings of Jerome are come down to us. Several of them are merely controversial; but there are others of a more sterling and lasting value. These are, his treatise on the Lives and Writings of the elder Christian Fathers, and his Commentaries on the Prophetical Books of the Old Testament, on the Gospel of St. Matthew, and several of St. Paul's Epistles. But what may be regarded as his greatest work is a translation of the books of both the Old and New Testament into Latin, which translation has been always highly valued in the Latin Church, and which is that known in the Church by the name of the Vulgate. It is a question amongst the learned how far, and whether at all, he embodied an older Italic version in his translation. If it was the first effort at bringing the Scriptures within the reach of the great multitude who knew no other language but the Latin, it was a great and noble work, which ought to place its author high amongst the benefactors of mankind. Bishop Warburton says of Jerome, that 'he is the only father that can be called a critic on the sacred writings, or who followed a just or reasonable method of criticising.' A treatise of his was one of the first books printed in England. The best edition of his works is that of Vallarsius, in 10 folio volumes, printed at Verona, 1734—40.

JEROME OF PRAGUE. [Huss.]

JERSEY, an island in the English Channel, about 18 miles south-east of Guernsey, measuring in a straight line between the nearest points of the two islands: between 49° 9′ and 49° 16′ N. lat., and 1° 58′ and 2° 14′ W. long. Its form approximates to a quadrangle, having its sides facing the four cardinal points. Its greatest length from east to west is about 12 miles; its greatest breadth from north to south about 7 miles. Of its area we have no account: the population in 1831 was 36,582.

The surface of the island has a gradual slope from north to south. On the north side the coast is abrupt, rising to the height commonly of 100, sometimes of 200 feet, and broken by a succession of small bays and coves, one of which, Bouley or Boulay bay, has been several times surveyed, in order to the formation of a naval station, for which its easy access and good anchorage seemed to offer considerable facilities. A pier on a limited scale has been erected here by the States of Jersey. On the east side of the island are two bays, St. Catherine on the north-east, where the coast is abrupt; and Grouville on the south-east, with a low shelving beach. On the west side is the wide shallow bay of St. Ouen, with a shelving sandy beach, skirted in nearly all its extent by ledges of rocks. On the south side of the island the character of the coast is less uniform; at the bottom of the deep bays of St. Aubin and St. Brelade it is low and shelving, with a broad belt of sand nearly a mile wide in St. Aubin's bay, and dry at lowwater. The headlands at the south-west point of the island, and between the before-mentioned bays, are lofty and abrupt; between St. Aubin's bay and the south-east point of the island the coast is low, but skirted by extensive ridges of rocks. St. Aubin's bay, on which stand the towns of St. Helier and St. Aubin, is the most frequented; but most of the bays afford anchorage.

Groups of rocks surround the island at various distances from it; there are also many banks and shoals.

The surface of the island is everywhere undulating. The valleys generally run from north to south; they are narrow at the north end, where the high ground forms an almost unbroken hill, and grow wider as they approach the southern coast, where they expand into several flats of good pasture land. A few valleys open to the eastern and western sides of the island. The principal water-courses flow from north to south; they are more considerable than from the size of the island would be supposed, and serve to give motion to several mills. The valleys watered by these streams are 'as rife in beauty as wood, pasturage, orchard, a tinkling stream, and glimpses of the sea can make them.' (Inglis's *Channel Islands*.)

The high land in the northern part of the island consists for the most part of granitic rocks; the southern part of a mass of schistose rocks incumbent upon them. The high rocks which stretch away to sea all round Jersey seem to be of granitic formation. The rocks along the northern coast consist for the most part of sienite; they present perpendicular faces to the sea, and are everywhere intersected by perpendicular veins running north and south, which have formed many remarkable caverns where they have been exposed to the action of the sea. The sienite is quarried on the northern coast; part of the stone is used on the island, part is exported to Guernsey and England, and, in time of peace, to France. No metallic traces, except of iron, have been observed in Jersey; the schistose rocks have not afforded any slates for economical purposes; nor does the island yield any lime. Jersey was until of late years ill provided with roads, for the old roads, though numerous, are narrow and inconvenient. The new roads, which are also numerous, are wide and well constructed, and traverse the island in many directions.

The climate of Jersey, from its insular situation, is milder than that of other places under the same latitude, and the mean annual temperature is higher than that of any part of England. Snow and continued frost are rare, but there is much rain, and the dews are very heavy. High winds are prevalent and violent; gales frequently blow, especially from the west; a perfectly calm day even in summer is rare. The predominant diseases are rheumatism, chiefly chronic, liver complaints, indigestion, dropsy, hypochondriasis, and remittent, typhoid, and intermittent fevers. Rheumatism, the most prevalent disease, is ascribed to the humidity of the atmosphere.

The state of agriculture in Jersey is backward, which is partly owing to the minute subdivision of property, arising from the custom of gavelkind. Rents are about 4*l.* 10*s.* per English acre for the average of good land, and above 5*l.* for the best. The expenses of the farmer are however light, and the productiveness of the soil great. Wheat is the principal grain crop; barley is grown, and some oats; parsnips are extensively grown and used for fattening hogs and bullocks. Potatoes for exportation are widely and increasingly cultivated. Lucerne is one of the most valued crops. A considerable portion of the land is laid out in orchards: the apples are converted into cider, which constitutes the most important produce of the island; then follow potatoes, lucerne, and wheat. The principal manure is vraic or sea-weed, either fresh, or after it has been burnt for fuel; fresh vraic is preferred for grass land, vraic ashes for other crops. Fallows are seldom seen. The wheat harvest commences about the beginning of August. The common English fruits are raised in Jersey, and the melon and the grape grow in the open air.

The cow is an object of great attention in Jersey. The breed is one variety of that known in England as the Alderney, but is considered to be deteriorating. Jersey butter is in high esteem; and great quantities, fresh and salt, are exported. A few sheep are kept only by the poorer classes who have right of common. Little attention is paid to horses: the breed was crossed with the Cossack horses during the stay of some Russian troops in the island in the year 1800. Of game there are the hare and the rabbit, and the red-legged partridge. Toads are numerous, as well as snakes and lizards. The fish caught in the island are similar to those of Guernsey. [Guernsey.]

Jersey is divided into twelve parishes. The parishes are subdivided into 'vintaines' ('scores'), supposed to be so called from having originally contained twenty houses. Of these vintaines there are from two to six in each parish, and in all fifty-two.

There are three towns in the island, St. Helier and St. Aubin [Aubin, St.], both on the Bay of St. Aubin, and Gorey, on the east coast. St. Helier is toward the south-east point of the bay, and fronts the sea. In external appearance it is much on a level with English country towns of the same size; except that the ramparts of Fort Regent, overtopping the buildings, give to the place the appearance of a continental town. The houses in the more central parts of the town are chiefly inhabited by the shopkeepers; those in the outskirts, extending to the foot and up the slopes of the surrounding heights, are tenanted by the more opulent merchants, and by the nu-

merous English residents, of whom there are computed to be 3000 in the island, many of them half-pay officers and their families. Some of the new streets in the outskirts are regular and well built, and have open spaces and ornamented garden ground in front of them. The principal public buildings are, the old church, two of the chapels, the theatre, and the gaol; of these, only one of the chapels, built in the Gothic style, and the portico of the theatre, have any claim to architectural design. The market is almost unequalled in the season for its display of garden produce. The Royal Square is an open space, flagged with smooth stones, surrounded by the principal book-shops, newspaper offices, reading-rooms, the court-house, and one of the principal hotels. There are two fortresses: Elizabeth Castle on a rock in the bay opposite the town, which would be insulated at high water but for a narrow causeway formed by the confluence of the tides between the castle and the shore; and Fort Regent, a strong fortification, commanding the town, of considerable strength, but inadequate accommodation. The harbour is formed by two piers jutting out into the bay at the south end of the town.

Gorey is in Grouville parish, and on Grouville Bay. It is built partly close to the sea and partly on the height which rises toward Mont Orgueil Castle. The importance of Gorey depends on its oyster fishery, in which upwards of two hundred and fifty boats, half of them belonging to the island, and as many as fifteen hundred sailors, are employed, besides a thousand persons, chiefly women and boys, who are engaged in matters connected with the fishery. The larger oysters are sent to St. Helier for sale, the smaller are sold and transported to the English oyster-beds. The produce of this fishery is supposed to bring to the island 20,000*l.* or 30,000*l.* per annum. In the neighbourhood of Gorey is Mont Orgueil Castle, once the principal fortress of the island, on a headland between St. Catherine's and Grouville bays. Its commanding situation on a rocky headland jutting into the sea, and commanding a fine land and sea view, and its massive walls, in many parts yet entire and mantled with ivy to their very summits, render it a picturesque and striking object. It was the place of confinement of Prynne, and the residence of Charles II. during part of his exile.

The other places in the island are mere hamlets, grouped round the churches of the several parishes or scattered along the coast. Scattered over the island are the antient manor-houses, and there are several modern villas, especially near the towns. Every house and cottage, not in a street, has its garden. Myrtles, hydrangias, and various other plants which in England commonly require shelter, grow luxuriantly in the open air.

The churches are of various dates, but all of considerable antiquity; their situation is in general well chosen, but they present no particular architectural beauties.

Much of what has been said of the state of society and the constitution of the local government in Guernsey [GUERNSEY] will apply to Jersey. The spirit of independence is very generally diffused; industry, the love of gain, and a frugality degenerating into penuriousness, are characteristics of the island character. The common diet among the farmers and country people is 'soupe à choux,' or 'soupe à la graisse,' made by boiling together cabbage, lard, and potatoes; sometimes, but rarely, a little meat is added, and parsnips or turnips are substituted for potatoes. Cider is the common drink. This meagre diet has probably contributed to a deterioration of the inhabitants both in stature and appearance.

The states of Jersey consist of the governor and the bailly of the royal court, both appointed by the crown; the twelve judges of the royal court (the court of judicature for the island in civil and criminal cases), elected to office for life by the suffrage of the rate-payers; the rectors of the parishes, appointed to their livings by the governor; and the twelve constables elected every three years, one for each parish, by the inhabitants. The officers of the crown have seats, and can speak, but not vote. Local politics engross the greatest attention, party spirit rages furiously, and has a very unfavourable effect on the constitution of the royal court, the judges of which are appointed by popular suffrage, and generally after a vehement party struggle.

The dean of Jersey, who is appointed by the crown and is always rector of one of the twelve parishes, is at the head of the church of the island, and holds a spiritual court, from which there is an appeal to the see of Winchester. The livings are all small (the great tithes going to the crown), and there are no pluralities.

There are two antient chartered schools, with inadequate endowments; one of them, that of St. Anastase, has no scholars, and the other, that of St. Manelier, is in a languishing state. There are however a National School at St. Helier, some parish schools with slender endowments, and several private seminaries and Sunday schools. Elementary instruction is very generally diffused, and there is scarcely a child in the island who is not at school. There is an island 'hospital' or poorhouse, but without any general medical or educational departments, and every way inferior to that of Guernsey. [GUERNSEY.] There are several newspapers, some in French and others in English; they are for the most part devoted to party interests, and much seasoned with personalities.

The trade of Jersey, owing to the privileges possessed by the islanders, is very considerable. The agricultural produce of the island, potatoes, apples, cider, butter, cows, and other live stock, are sent to England; the articles required for the consumption of the island being in a considerable degree supplied from France. Foreign wheat is made into biscuit, and foreign leather into boots and shoes, and exported to the British colonies as 'Jersey manufacture;' and vessels, which are admitted to register as British, are built with foreign materials. The shipping belonging to the island has an aggregate tonnage of 21,000, beside 300 large boats.

The general history of the Channel Islands has been noticed elsewhere. [GUERNSEY.] Jersey, the Cæsarea of the Romans, is said to have been originally called Augia. In the reign of Edward III. this island was attacked by Du Gueselin, constable of France, but the arrival of succours from England prevented him from succeeding. In the war of the Roses it was attacked by a Norman baron, Pierre de Breze, avowedly for the Lancastrian party, but really for the French king. After holding part of the island for a time, he was forced to surrender. Henry VII., while earl of Richmond and an exile, and Charles II., while an exile, both before and after his father's death, found refuge in Jersey, which was held for Charles by the valour and constancy of Sir George Carteret until taken by the Parliamentarians under Admiral Blake and General Haines.

During the first American war, Jersey was thrice attacked. The first time (May, 1779) was by an armament with a land force of 5000 or 6000 men, under the prince of Nassau, but the attempts to land were repulsed. In the second attack the French fleet was attacked and destroyed by Sir James Wallace. The third attack was in December, 1780, when the Baron de Rullecourt landed with 700 men, took possession of St. Helier, and made the lieutenant-governor, Major Corbet, prisoner, and induced him to sign a capitulation. The British troops and island militia, under Major Pierson, next in command, refused to recognise the capitulation; and attacking the French, killed Rullecourt, with the greater part of his men, and obliged the rest to surrender. Major Pierson fell in the beginning of the attack.

JERSEY, NEW, one of the republics of the United States of America, extends from 38° 55′ to 41° 21′ N. lat., and from 74° to 75° 45′ W. long. Its length from south to north is 170 miles, and its mean breadth 46 miles. Its surface is estimated at 7870 square miles, which exceeds that of Wales by 400 square miles. Delaware river and bay divide it on the west from the states of Pennsylvania and Delaware, and the Hudson river on the east for a short distance from New York. An imaginary line, 45 miles long, forms its northern boundary towards New York. On the east and south it is washed by the Atlantic and Delaware Bay.

About one half of its surface, including all the country south of a line drawn from Bordentown on the Delaware river to Shrewsbury on the eastern coast, is so level that it is difficult to distinguish the watershed between the streams which fall into the ocean from those which empty themselves into Delaware Bay. All this tract is covered with a sea-sand alluvium, and parts of it are completely barren. The western shores along Delaware bay are covered with salt-marshes, which produce a coarse hay. Along its eastern shores there is a series of long, narrow, and low islands, similar to those along the coast of the two Carolinas; but the inlets by which those islands are divided are deeper and more spacious, and vessels of moderate draught can enter the ports of Great Eggharbour, Little Eggharbour,

Barnegat, Tomsbay, and Shark Inlet. North of the line drawn from Bordentown to Shrewsbury the country is hilly, but the hills are of moderate elevation, and the wide valleys between them have a good loamy soil. At the eastern extremity of this tract, and immediately on the sea-shore, are the Neversink hills, which, though only 281 feet above the sea-level, are the highest eminences on the Atlantic shores from Florida Cape (25° 50′ N. lat.) to this point (40° 25′). The hilly tract covers somewhat more than one-fourth of the surface of New Jersey. The most northern portion is divided between a marshy and a mountainous tract: the former lies along the banks of the river Hudson, and extends about 10 miles from them on an average; it is of moderate fertility. The mountainous tract occupies the remainder, and contains two ridges, which traverse the north-western corner of the state in a direction south-west and north-east. The southern chain is called the Blue Ridge, and the northern the Kittatinny Mountains; in the latter is Shooley's Mountain, 1100 feet above the sea. These ridges are mostly covered with forest trees, and the country between them has a good soil.

The large rivers of this state are those which constitute its boundary, the Hudson [NEW YORK] and the Delaware [DELAWARE]. A canal has been cut between these two large rivers, called the Morris canal, which traverses the northern districts of the state. It leaves the Delaware at Philipburgh, opposite Easton, and runs in the valley between the Blue Ridge and the Kittatinny Mountains north-east; it is then carried through a depression of the first-mentioned ridge, and along the Passaik river eastward and southward to Newark; it then crosses that river and passes through the marshes to Jersey city, opposite New York, where it joins the Hudson. Its length is somewhat more than 100 miles. Among the minor rivers the Rariton is the largest. It traverses the hilly district and falls into Amboy Bay, which is a good harbour for vessels of middling size. The Rariton is navigable for 16 miles from its mouth. Newark Bay also receives the Hackensack and the Passaik, of which the former is navigable for 16, and the latter for about 10 miles from its mouth. The Maurice river, which empties itself into Delaware Bay not far from Cape May, the southern extremity of the state, is said to be navigable for vessels of 100 tons to a distance of 20 miles from its embouchure.

The difference in climate between the southern and northern districts is very great, and depends mainly on the difference of elevation. The level sandy plains of the southern districts approximate to the temperature of Eastern Virginia, and admit the cultivation of cotton, while the mountainous northern districts experience early and severe winters, and in this respect resemble Vermont and New Hampshire. The vegetable productions are seldom injured by drought or excess of rain.

Wheat, rye, Indian corn, oats, barley, buck-wheat, flax, and potatoes are the common crops; buck-wheat is in very general cultivation. The cotton grown in the southern district is consumed for the domestic manufactures. Apples, pears, peaches, plums, and cherries are the common fruit-trees, and they succeed exceedingly well. The Jersey cider is noted for its superior quality. In the mountainous parts and salt-marshes near the sea-coast great numbers of cattle are raised. Sheep are also kept in great numbers. The sea abounds in fish, and the inhabitants of the coast derive a great portion of their subsistence from the fisheries. The forests are composed of oak, hickery, chesnut, poplar, ash, &c. The larger wild animals have nearly disappeared, and only the racoon and the red and grey fox abound. Iron abounds in the mountainous and hilly district, and bog iron is found in the marshes along the sea. There is also copper, and, in the primitive rocks of the mountainous districts, gold, silver, and galena.

The inhabitants amounted in 1830 to 320,823. The state is divided into 14 counties and 120 townships. The principal occupation of the inhabitants is agriculture; but the surplus population has lately turned to manufacturing industry, and in some branches a considerable progress has been made, though the distress of late years has caused a depression. Besides numerous iron-works, several glass-houses, tanneries, gunpowder-mills, and cotton manufactures are established, mostly in the hilly country, which is the most populous.

Trenton, on the Delaware, the capital and the seat of government, is a small place, with about 4000 inhabitants, and some cotton manufactures. The largest towns are in the hilly district, where New Brunswick, on the river Rariton, at the head of tide-water, contains 8000 inhabitants, and has some commerce, and a college; and Newark, on the Passaik river, with about 10,000 inhabitants, carries on a considerable trade with New York, and has manufactures of carriages, shoes, and saddles. Patterson, on the Passaik, which forms near the town a cataract 70 feet high, is the principal manufacturing town of the state, and contains near 8000 inhabitants. The principal articles made here are iron and brass wire, and cotton-cloth. Perth Amboy, situated where the Rariton falls into Amboy Bay, has a harbour, but only 1000 inhabitants. It is the oldest settlement in the state. South Amboy, on the opposite side of the bay, has a population of near 4000. The towns of Shrewsbury and Freehold, both on the eastern shores, have some commerce, and each of them about 5000 inhabitants. At Princeton, between Trenton and New Brunswick, there is a college, called Nassau Hall, one of the oldest establishments in the United States, and also a theological seminary.

That none of the maritime towns of this state have risen to importance is easily accounted for by the vicinity of New York and Philadelphia, to which the produce of the country is sent. This produce consists of live cattle, fruit, iron, butter and cheese, hams, flax-seed, cider (of which that of Newark is the best), lumber, and some manufactures, especially leather, glass, cotton-cloth, and iron-ware.

Besides the canal already described, the Delaware and Rariton canal, which is 38 miles long, runs from near Trenton to New Brunswick. The Camden and Amboy railroad, which is 61 miles long, forms a line of communication between Pennsylvania and New York, passing by South Amboy. The Patterson and Hudson River railroad, which is 14 miles long, connects Patterson with Jersey city.

New Jersey was first settled by the Dutch in 1612, in those places contiguous to the Hudson river. The Swedes established themselves here in 1628, but their settlements soon fell into the possession of the Dutch, who were supplanted by the English in 1664. New Jersey was then a part of New York, from which it was definitively separated in 1736. It declared itself early against England in the revolutionary struggle, and published its present constitution on 2nd July, 1776, two days before the declaration of independence by the Continental Congress. The legislature consists of a legislative council of 14 members, and of a general assembly of 50 members. The judges hold office for a fixed number of years. New Jersey sends two members to the senate at Washington, and six to the house of representatives. (Darby's *View of the United States*, and Warden's *Account of the United States*.)

JERUSALEM, the chief city of Palestine, in Syria, situated in 31° 47′ N. lat. (according to Niebuhr), 35° 19′ E. long.; 38 miles east from the nearest point (near Ashdod) towards the Mediterranean, and 27 miles west from where the river Jordan enters the Dead Sea.

The name is written יְרוּשָׁלַםִ by the early Hebrew writers, and יְרוּשָׁלַיִם by the later; and signifies *the abode*, or (according to another derivation) *the people of peace*. At present the city is known throughout Western Asia by the Arabic name of *El-kuds*, which signifies 'holiness.' By the Greek and Latin writers it is called Hierosólyma. (Strabo, p. 760; Tacitus, *Hist.* v.)

As the capital city of the Hebrews, and the chief seat of their worship, as well as from its connection with the early history of Christianity, Jerusalem has always been held in great veneration by both Jews and Christians; and, from the same causes, even the Mahommedans regard it with interest and respect. Hence the numerous pilgrimages and travels which have in all ages been made to the holy city, and hence the various contests of the middle ages, between the European Christians and the Moslems, for its possession.

The situation of Jerusalem is rather singular, and offers many advantages, particularly in a military point of view, which were probably considered more than adequate to compensate its disadvantages as the seat of a metropolitan city, for which many think that Samaria offers a preferable situation. But whatever were its advantages or disadvantages, the metropolitan character was fixed to it beyond all possibility of alteration by the foundation there of the only temple for the formal worship of God which the whole country contained.

The site of Jerusalem may be described, with some latitude, as an elevated piece of ground within a basin of enclosing hills. The separation between this spot and the outward borders of its enclosure is well marked by ravines and valleys, except towards the north, where the natural separation of the site from the surrounding country is less noticed. The enclosed platform extends about 1800 yards from north to south, and (in the widest part) 1100 from east to west: it has a general slope from west to east, so that the town is fully displayed, like a panorama, to those who view it from the east. The surface of the platform is uneven, and ends, southward, in the elevated termination so often mentioned in Scripture by the name of Mount Zion. This part is excluded from the modern city, and the ascent to it from the town is not very considerable, although it rises high above the deep external ravine which it overlooks. The other eminences of the platform, such as Mount Moriah (on which the Temple stood), and Mount Acra, are now scarcely distinguishable as elevations, probably from the gradual filling up of the interjacent valleys. Except at Mount Zion the general level of the site is below that of the immediately surrounding country; yet considering that it is not very distant from the sea, its positive elevation above the sea-level is considerable. Of the valleys which surround the city, that to the east, through which lies the course of the torrent Kedron, is usually called the Valley of Jehoshaphat, and abounds in antient and modern sepulchres. Beyond it rises a group of hills, of which the Mount of Olives is the principal, if indeed that denomination does not include them all. The southern valley is narrower, with more abrupt cliffs, and is indeed a rocky ravine, appearing to have been antiently quarried to supply stone for the buildings of the town. Beyond this valley rises a broad and barren hill; while the western valley, which has received the Scriptural names of the Valley of Gihon and of Rephaim, is bounded by a rocky flat, which rises to the north, terminating in a considerable elevation; to this the name of Mount Gihon has been given.

As the interest of the spot arises solely from its antient history, and no remains exist of the buildings which that history mentions as belonging to the period which it embraces, we have been thus particular in noticing the natural characteristics of the place, since they are unchanged, and are often alluded to in the sacred writings and in the histories of the many sieges which Jerusalem has sustained. Some substructions, and the sepulchral excavations in the cliffs around Jerusalem, seem to be all the remains of antient Jewish works which can now be recognised, unless we be disposed to add the sculptured monuments in the valley of Jehoshaphat, which pass under the names of the tombs of Absalom and Zachariah.

In the style of building and arrangement of streets, there is little to distinguish Jerusalem from other walled and stone-built Turkish towns of the same rank. The attention of pilgrims and travellers is chiefly engaged by the sacred places concerning which numberless volumes have been written. There is scarcely any incident mentioned in Scripture, as connected with Jerusalem and its neighbourhood, of which the site is not very distinctly pointed out; but in most instances the authority of such indications cannot but be considered as extremely uncertain. Very ample accounts of all these spots may be found in the works of Cotovicus, Roger, Morison, Surius, Rochetta, and others. In our own language Maundrell supplies a very excellent account, to which the principal additions have been made by Clarke, Buckingham, and Richardson. But the most valuable and trustworthy authority for the dimensions and plan of Jerusalem is the recently published volume of Niebuhr's 'Travels,' Hamburg, 1837.

The Moslems have appropriated the site of Solomon's temple to their own worship. The renowned Sakkara, built by the Khalif Omar, is an octangular structure surmounted by a dome, and stands upon an elevated platform paved with polished marble. This is in the midst of a grand quadrangle (1489 feet by 995), which contains at its southern extremity another mosque, that of El Aksa, which was originally the church by which the Christians distinguished the site of the Jewish Temple. The entire locality is fully described by Dr. Richardson, who obtained the singular privilege of admission to the interior. But to the thousands of Christian pilgrims who yearly visit Jerusalem the great object of interest is the church which contains the alleged sepulchre of Christ, to redeem which from infidel hands was at first the real, and always the ostensible, object of the Crusades. This church was one of the numerous foundations of the empress Helena. As a whole this extensive structure takes a prolonged oblong figure, with irregular extensions in particular parts for the sake of comprehending the various spots connected with the death and burial of Christ; for this church is not only supposed to contain the sepulchre, but the scene of the Crucifixion. The probability of these identifications has however, on very sufficient grounds, been much questioned by some recent travellers. A great part of this church was destroyed by fire about thirty years ago, and has since been restored on the former place, but with inferior materials. The other public buildings of Jerusalem are not of much importance, and do not require particular notice.

Jerusalem, as a whole, is still a respectable looking town; it is of an irregular shape, approaching nearest to that of a square, and is surmounted by a high embattled wall, built of the common stone of the country—a compact limestone. It has seven gates, and is about two miles and a half in circumference. The population of the city has been so variously estimated as to show that it has only been conjectured. Some accounts rate it at 20,000, or even higher; but, from a comparison of estimates and circumstances, we should suppose the Rev. W. Jowett nearest the truth when he states, 'I should think that 15,000 was too high; and should not be very unwilling to rate it at 12,000. In this calculation of course the pilgrims are omitted, who are crowded into the convents, and fill up many spaces which are vacant nine months in the year, augmenting the population by some few thousands.' He supposes that about one-third of the whole are Jews, and that the Moslems are something more than one-third, and the Christians something less.

The history of Abraham mentions that 'Melchizedek, king of Salem,' came forth to meet him when he returned from the slaughter of the kings; and it has generally been supposed that this 'Salem' was the original of the city to which the names of Jebus and Jerusalem were afterwards given. It is more certain, that, when the Israelites entered Canaan, they found the place in the occupation of the Jebusites, a tribe descended from Jebus, a son of Canaan, whose name the city then bore. The lower city was taken and burnt by the children of Judah (*Jud.*, i. 8) after the death of Joshua; but the Jebusites had so strongly fortified themselves in the upper city, on Mount Zion, that they maintained themselves in possession of it till the time of David. That monarch, after his seven years' rule over Judah in Hebron, became king of all Israel, on which he expelled the Jebusites from Mount Zion and made Jerusalem the metropolis of his kingdom. From that time forward there is no city the history of which is more closely connected with that of the people to whom it belonged, and of the country of which it was the capital. For this reason, as well as because of the disproportionate extent which would be given to this article, we do not here notice the numerous details which its particular history embraces. The history of Jerusalem has been given in outline as a part of various works; but we know no complete and separate history besides the 'History von Jerusalem' (down to 1481) of Sebastian Brant (1518). Of the Temple there is a large but not very instructive Arabian history, lately translated into English by Mr. Reynold, under the auspices of the Oriental Translation Society. The Travels of Niebuhr, before referred to, contain a ground-plan of the present city.

JERVIS, JOHN, Earl of St. Vincent, and Admiral of the Fleet, was born at Meaford in Staffordshire, January 9, 1734, O.S.; entered the navy at ten years old; was posted into the Gosport, 40 guns, in 1760; and appointed to the Foudroyant, 80, in 1774. In this ship, which was distinguished for her discipline and effective state, he fought in Keppel's action in 1778; captured the Pégase, French 74, in 1782, for which he received the order of the Bath; and in October of the same year sailed with Lord Howe to the relief of Gibraltar. He was promoted to the rank of rear-admiral, September 24, 1787; and sat in parliament for various boroughs from 1782 until the breaking out of the French Revolutionary war, when he sailed in command of a squadron to reduce the West India Islands, and captured Martinique, Guadaloupe, and St. Lucia. At the end of 1794 sickness drove him home. He was promoted to be Admiral of the Blue, June 1, 1795, and in the autumn took command of the Mediterranean fleet, with which he performed

the great exploit of his life, by intercepting and defeating the Spanish fleet off Cape St. Vincent, in February 14, 1797. The disproportion of force was greater, it is said, than any modern officer had ventured to seek an encounter with, the Spaniards having nearly double our number of ships, and more than double the number of guns and weight of metal. However, Jervis, repeating Rodney's method of breaking the line, gained a complete victory, and captured four sail of the line. In this celebrated engagement the services of Nelson were pre-eminent. The actual loss sustained by the enemy was of less importance than the lustre cast on the British arms by a victory achieved against such odds. Thanks, couched in the most flattering terms, were voted by both houses of parliament; and Sir J. Jervis was raised to the peerage by the title of Earl of St. Vincent and Baron Jervis of Meaford, and received a pension of 3000*l*. Shortly after, his presence of mind and moral courage were severely tried by the breaking out of a branch of the Channel mutiny in his fleet; which however was speedily suppressed by his judicious and decisive severity. Having suffered for some time from ill health, he returned home in 1799; but in April, 1800, took command for a short time of the Channel fleet, on the resignation of Lord Bridport. He was made first Lord of the Admiralty in February, 1801, on the formation of the Addington ministry; and having through life had a sincere dislike of peculation and jobbing, at once set vigorously to cut down extravagant expenditure and to reform abuses. This of course made him very unpopular; and he was accused of rashness, and of crippling the resources of the country by a false economy. Charges of this sort were then very sure to be made against those who exerted themselves to reform old and lucrative abuses. Mr. Pitt partook of the dissatisfaction, and at his return to office, in May, 1804, placed Viscount Melville at the head of the Admiralty. Earl St. Vincent again took command of the Channel fleet in 1806, in Fox's administration, but held it only for a year. His last appearance in parliament appears to have been in 1810, in the debate upon the king's speech, when he spoke strongly in censure of the conduct of the war by ministers. He was appointed Admiral of the Fleet on the day of George IV.th's corronation, July 19, 1821, and died March 15, 1823, in the 90th year of his age. Having no children, the earldom became extinct: but the title of Viscount, by special grant, descended to his nephew Mr. Ricketts. A public monument was erected in honour of him in St. Paul's cathedral.

Earl St. Vincent's professional characteristics were courage, coolness, and decision, amounting almost to sternness of character: these, united with great skill and indefatigable activity, rendered him an admirable officer. He was very independent; and the disposal of his patronage, in which he paid great and unusual consideration to the claims of deserving officers, did him honour.

JESUITS, SOCIETAS JESU, is the name of a celebrated religious order which was formed towards the middle of the sixteenth century. Ignatius or Iñigo Loyola was a Biscayan officer of noble birth, in the Spanish army at the beginning of the reign of Charles V. Being severely wounded in the defence of Pamplona, then besieged by the French and the Navarrese, he underwent a long and tedious confinement previous to his recovery. Loyola was a man of enthusiastic mind; he had been fond of the world, and devoted to gallantry and pleasure; but now, in his forced retirement, he was struck with the precariousness and futility of those pursuits, and he resolved to devote himself to a life of piety and religious labour, for the purpose of reclaiming the minds of his fellow-creatures from vanity and sin. Musing on this subject, he conceived the plan of establishing a religious order, which should be entirely devoted to the four following objects: 1. The education of youth. 2. Preaching, and otherwise instructing grown-up people. 3. Defending the Catholic faith against heretics and unbelievers. 4. Propagating Christianity among the Heathens and other infidels by means of missionaries. Ignatius, having begun to promulgate his views, and to attract attention by preaching against the loose morality of the times, fell under the suspicions of the Inquisition, and was imprisoned, but afterwards released. He then undertook several pilgrimages, and at last repaired to Paris, where he studied and took holy orders. It was at Paris in 1534 that he and six of his friends and fellow-students entered into a solemn compact to promote Loyola's object, the foundation of a new religious order. These first companions and fellow-labourers were Francis Xavier, Lainez, Salmeron, Bobadilla, Rodriguez, and Le Fevre. They were afterwards joined by three more: Lejay, Codur, and Brouet. Ignatius with his friends repaired to Rome in 1537, where he laid before Pope Paul III. an outline of the institutions and regulations of his intended order. Loyola had been a military man, and he based his rules upon the principle of a strict subordination, carried through several gradations, terminating with the præpositus generalis, or general superior, who was to have absolute sway over the whole Society, and from whose decisions there was to be no appeal. The general was to be subject to the pope only. Most of the old monastic orders had a considerable share of democracy in their institutions they assembled in chapters and elected their local superiors, and decided upon other questions concerning their community by a majority of votes, and although they had also their respective generals residing at Rome, yet their authority over the distant convents of the various provinces was very limited. Their chapters occurred frequently, and their generals and provincials were mostly changed every three years. All this gave them something of a popular character· they had their canvassings for elections, their personal ambition, and intrigues. But Loyola's projected order was strictly monarchical, and therefore adapted to be a more effective support to the Roman see, at a time when support was most wanted in consequence of the spreading of the Reformation. Besides this, the wealthier of the monastic orders, such as the Benedictines, employed their leisure in scientific and speculative studies, living retired and knowing little of political affairs; and the mendicant orders, or friars, had degenerated from their first zeal, and had become obnoxious by the sale of indulgences, and despised for their corruption, ignorance and vulgarity. The prelates of the court of Rome, such as Bembo and Leo X. himself, spoke with open scorn of the friars, and called them hypocrites. Another advantage of the proposed constitution for the Jesuits was, that they were not bound to keep canonical hours in the choir like other monks, and therefore had more uninterrupted leisure for study or business.

Pope Paul III., after deliberating with his cardinals, some of whom were not favorable to Loyola's plan, approved of it, and it was decided that the new order should be called the Society of Jesus, that the members should wear no monkish garb, but dress in black, like the secular priests, and should in fact differ essentially from the monastic orders then existing. The bull of the pope authorizing the new Society was issued in 1540, and in it, by a remarkable privilege, the general of the Jesuits was authorized to issue such regulations as he judged fit, and to alter the existing ones according to time, place, and circumstances. The original 'Constitutiones' of Ignatius were written in Spanish, but afterwards translated into Latin. The first edition of them appeared at Rome, 'Constitutiones Societatis Jesu,' 1558, after the death of the founder, who expired on the 31st July, 1556. He left also a mystical treatise called 'Exercitia Spiritualia.' At his death the Society was already established in Italy, Spain, Portugal, and Germany, and had above one hundred schools, besides numerous missionaries in the East and in Africa and America. Ignatius was succeeded as general of the Society by James Lainez, a man of more extensive information and greater elasticity of character than his predecessor. It is to Lainez that the principal share in framing the 'Constitutiones' is attributed, and that work bears the impress of a master mind. Cardinal Richelieu said that it was a model of administrative policy. The Constitutiones are divided into ten parts, subdivided into chapters. Part i., 'De admissione ad probationem,' concerns the mode of admission of applicants for the noviciate; the qualifications required in the applicant, such as health, no grievous deformity or mutilation, or other physical imperfection; certificates of good conduct and temper, natural abilities, and fourteen years of age complete. Birth, wealth, and other accidental circumstances are to be considered as null where the physical and mental qualifications fail; but should they be united with these in the same individual, they render him more acceptable. Then comes a list of absolute impediments to admission, such as having committed murder, apostacy, and other grievous offences, having been subjected to a degrading sentence, having belonged to some monastic order, being married, and lastly, labouring under insanity or decided weakness of intellect. Defects of temper, obstinacy, injudicious enthu-

siasm or visionary devotion, being involved in debt and other civil ties, are not absolute impediments, but the consideration of them is left to the discretion of the general or of any of his subordinates, to whom he may give the power of admitting probationary pupils. The candidate, if approved of, is admitted to a first probation, as a sort of guest for a few weeks in one of the houses of the Society, in order that he may become acquainted with the mode of living. He afterwards assumes the dress of the order, and is examined by proper examiners upon the numerous points contained in the printed form, *Primum ac Generale Examen iis omnibus qui in Societatem Jesu admitti petunt proponendum*, Rome, 1558. Should the examination prove satisfactory, the applicant is shown the constitutions and regulations of the Society; and after, confessing himself and receiving the sacrament, he signs a declaration that he will observe the rules and discipline thereof, and he is then admitted into one of the houses of second probation, or noviciate. Part ii., 'Quæ ad eos dimittendos pertinet, qui ad probationem admissi fuerunt et parum apti ad Societatem inveniuntur.' Those who during their noviciate are found, after mature experience, not to be fit subjects for the Society, on account of mental or bodily defects or vices, are to be dismissed privately, without scandal or exposure, and with kind advice and exhortations. Those who leave of their own accord are not to be sought after, unless they have qualities which make it desirable for the Society to retain them. Part iii., 'De iis conservandis et promovendis qui in probatione manent.' This part treats of the mental and moral discipline to which novices are subject; docility and obedience are to be inculcated, pride and obstinacy to be conquered: it treats also of the physical education, cleanliness, wholesome diet, proper exercise, &c. The term of probation lasts generally two years. Part iv., 'De iis qui in Societate retinentur instruendis in literis.' This part treats of the colleges and schools. The colleges have revenues derived from donations or bequests of benevolent persons; those colleges which can support twelve scholars besides teachers are not to collect alms or receive other eleemosynary offerings. After two years' probation, those who intend to enter the Society are received as scholastici in one of the colleges, and take the vows of chastity, poverty, and obedience. The courses are humanities and rhetoric, logic, natural and moral philosophy, metaphysics, and theology (both scholastic, and positive or dogmatic) and the study of the Scriptures. Besides the colleges or seminaries for the Society, there are classes and schools for lay or external pupils. Every college is under the direction of a rector, appointed by the general or by the respective provincials, and chosen from the class of coadjutors, and removable at pleasure. The Christian doctrine or Catechism is to be read and explained by the rector. Subsequent regulations were published at various times concerning the mode of instruction in the 'Ratio Studiorum' of Acquaviva, and the 'Methodus Docendi et Discendi a P. Juvencio in usum Magistrorum Societatis Jesu,' which was approved of by the 14th general congregation of the Society. Another chapter treats of the universities which belong, or may belong, to the Society; of the faculties of arts, philosophy, and theology; of the examinations and degrees, &c. The Society did not concern itself with the faculties of law and medicine. Part v., 'De iis quæ ad admittendum in corpus Societatis pertinent,' treats of the admission of scholars into the body of the Society, either as professi or coadjutors. The professi must have studied theology for four years, and be past twenty-five years of age. The formula of the profession is given. The vows taken on making profession before the reverend father-general, 'locum dei tenenti,' or any other superior appointed by him, are perpetual chastity, poverty, obedience, and a peculiar care of the education of youth; besides which the professi promise an especial obedience to the sovereign pontiff with respect to any missions which he may send them to. This last promise, or vow, is not made by the coadjutors. Part vi., 'De iis qui admissi et in corpus Societatis cooptati sunt, quod ad ipsorum personas attinet,' gives regulations for the manner of living in the professed houses, which, unlike the colleges, cannot have any property or settled income, but the inmate must live upon the alms given by the faithful. The coadjutors who are not employed in the colleges as rectors or teachers must live in the professed houses of charity, like the professi. The professi and the coadjutors must renounce all claims to hereditary succession, nor can the Society succeed to any of their claims. But there were also lay or secular coadjutors, who took the simple vows, yet continued to enjoy their property, and lived in the world at large. Part viii., 'De iis quæ pertinent ad admissos in corpus Societatis, ad proximorum utilitatem, in vineam Domini distribuendos,' treats of the various kinds of missionaries, those sent by order of the Pope, and those sent by the general of the society, and gives them directions, &c. Part viii., 'De iis quæ conferunt ad eorum qui dispersi sunt cum suo capite, et inter se, mutuam unionem,' recommends frequent reports and correspondence between the rectors and provincials and the general, and between the missionaries and other detached fathers with their respective provincials or other superior, &c. Every member of the Society is to report to his immediate superior any misconduct which he observes in any of his companions. The general receives monthly reports from the provincials, and quarterly ones from the superiors of professed houses, the rectors of colleges, &c. These reports contain notes on the disposition, capacities, and conduct of the individual members, besides news and occurrences which may affect or interest the body of the Society or any part of it. The second chapter of this part treats of the general congregations or representative assemblies of the Society; and it begins by saying, that owing to the regular and constant intercourse and correspondence kept up between the general and the local superiors, the trouble and confusion attending such general assemblies can be in great measure avoided, and they can only be necessary either for the purpose of electing a new general or for deliberating on some very weighty matter concerning the Society, such as the dissolution or transfer of its houses and colleges, &c. In the first case each province deputes its provincial and two more professed members, who are chosen by a provincial congregation, convoked for this special purpose, which provincial congregation consists of all the professi of the province who can conveniently attend, and those coadjutors who are rectors of colleges. In the second case, for purposes of deliberation, the father provincial appoints two of his subordinates, and the general may add some others, making not more than five deputies altogether, for each province. Part ix., 'De iis quæ ad caput Societatis et gubernationem ab eo descendentem pertinent,' concerns the qualifications, powers, and duties of the Præpositus Generalis. The general is for life, resides at Rome, is attended by a monitor and five assistants. From his orders there is no appeal: all are obliged to obey him unhesitatingly; he may expel members, or remove them wherever he pleases, inflict punishments, issue regulations, or alter the existing ones. His power is in fact absolute. Part x., 'De modo quo conservari et augeri totum corpus Societatis in suo bono statu possit,' contains advice to all and each of the various classes and members, recommending strict discipline, obedience, zealous teaching and preaching; not to seek after dignities or honours, and even to refuse them unless obliged by the Pope; strict morality, moderation in bodily and mental labour, brotherly charity, &c.

Lainez, being sent by the pope as his legate to the Council of Trent, was one of the chief advocates of the papal supremacy, and maintained, among other things, against the opinion of the archbishop of Granada and other Spanish prelates, that the jurisdiction of the bishops and their authority over any particular diocese is entirely derived from the pope, who is the fountain-head of all ecclesiastical authority, and that he can give it or suspend it, or transfer it when he sees fit. Lainez repaired also to the Conference of Poissy, in 1561, where he had to face Beza, and other Calvinist theologians, but his arguments, mixed with coarse vituperations against his antagonists, according to the polemics of the age, produced little effect. About the same time the Society, by the influence of the Cardinal de Lorraine, and after several years' struggle against the university of Paris and the Bishop du Belley, obtained letters patent from Francis II. to open colleges and schools in France. The Jesuits taught gratis, and the university, whose courses of lectures were paid for, was jealous of them, and attacked them repeatedly before the Parliament as an institution contrary to the laws and dangerous to the state. But this being the time of the great religious and civil war in France, the belief, says De Thou, that the Jesuits were born to conquer and destroy Protestantism, made the Parliament and the French prelates wink at their introduction into the kingdom, at least until further deliberation. William Duprat, bishop of Clermont, son of the Chancellor Duprat,

gave them a house in Paris which they made into a college, called the College of Clermont, and he bequeathed them also 36,000 écus in his will.

During the war of the League the Jesuits, like the other monastic orders, with the Sorbonne, and the Parliament of Paris, showed themselves opposed to the claims of Henri IV. as being a heretic. Even after the abjuration of that prince a fanatic of low birth, called Barrière, conspired to murder him, but was discovered, and it was found that a Capuchin, a Carmelite monk, a curate, and a Jesuit rector of the college at Paris were cognizant of and accessory to the conspiracy. Soon after another fanatic, Jean Chatel, attempted his life, and actually wounded Henri. This young man had studied under the Jesuits, but it was never proved that they had instigated him to the deed. It is true that among the papers of a Jesuit called Guignard some satirical and abusive expressions against the king were found, which seemed to imply an approbation of the crime. Chatel was broken on the wheel, and Guignard was hanged; and the Parliament of Paris, already instigated against the Jesuits by the university, decreed their banishment in 1594, which sentence however did not extend to the jurisdictions of the parliaments of Bordeaux and Toulouse. But at the end of 1603 Henri IV., at the pressing request of the pope, recalled the Jesuits, saying to the president, De Harlay, who remonstrated against this measure, that 'the Jesuits ought no longer to be charged with the crimes of the League, which were the error of the times; and as every state thought them useful in the education of youth, he should not shut the door against them, especially as he would not appear to mistrust his own born subjects.' On the 2nd of January, 1604, the parliament of Paris registered the king's letters patent for the restoration of the Jesuits. From that time they remained in France, where they greatly extended the number of their colleges and pupils, though always seen with a jealous eye by many, till their final expulsion in 1764. Their disputes with the Jansenists, which were carried on with great bitterness on both sides, are mentioned in the articles ARNAULD and JANSENISTS.

The Jesuits found their way into England under Elizabeth, in whose reign several of them were implicated in conspiracies against the queen, for which they were executed. It ought to be noticed however, that De Thou, who is no friend to the Society, states that the conspirator Parry, who is said to have been encouraged in his attempt by a Venetian Jesuit, met at Paris the Jesuit Vatz, who earnestly dissuaded him from his purpose, quoting the opinions of other learned men of the Society, who declared that no reason, political or religious, could justify an attempt against the life of a sovereign, however heretical. This and other similar instances prove that in so numerous a body as that of the Jesuits' society men of various tempers and opinions must be found, some of whom, through a strained casuistry or fanatical zeal, arrived at totally different conclusions from those of the more sober and more honest part of their community.

In the reign of James I. the Jesuit Garnet was tried for having participated in the Gunpowder Plot; and after exhibiting throughout his examination a great aptitude for equivocation, he was condemned and executed. A full investigation of this curious trial is given in vol. ii. of the 'Criminal Trials,' published by the Society for the Diffusion of Useful Knowledge.

The missions of the Jesuits form an important part of the history of their Society. The first attempts by Xavier were premature. He had more zeal than information, and the accounts of his numerous conversions ought to be received with caution. The arms of the Portuguese effected more conversions by force in India than Xavier's persuasion, who himself confesses that he could not understand nor be understood by the natives, though he could baptize them. In Japan, where he went unprotected by a Portuguese force, he failed; but he served as a pioneer to prepare the way for others better qualified for the task, and the Jesuits formed in time numerous Christian congregations in Japan. The history of the Japanese Christians, and their extermination in 1637, is found in Bartoli, *Historia della Compagnia di Gesu*, 'Il Giappone, seconda parte dell' Asia;' and it forms a narrative of considerable interest, written apparently with great simplicity. The author does not disguise the faults committed by the Christians, which contributed to their ruin.

In China the Jesuits were likewise successful, and their establishment there has been more durable. Bartoli, in another part of the same work, 'La Cina, terza parte dell' Asia,' gives an account of their settlement in that empire, and of their progress; and further information is found in the 'Lettres Edifiantes et Curieuses.' [HALDE, DU.] Between the years 1581 and 1681, one hundred and twenty-six European Jesuits were employed in the missions of China, many of them men of information, to whom Europe is indebted for the first authentic information respecting the internal condition of that vast empire. The generals of the Society chose men acquainted with mathematical and mechanical sciences, which they knew were in request at Pekin, and thus they obtained a footing and an influence at the emperor's court which no other Europeans have ever acquired. Although persecutions burst out against the Christians of China, yet the Jesuits never entirely lost their hold there, and their house at Pekin has continued to exist till our own times. [AMIOT, LE PERE.]

From India Jesuit missionaries found their way into Abyssinia, where Portuguese travellers had penetrated many years before [ALVAREZ], but the Jesuits went farther into the country, especially in its southern parts, than any other Europeans, either before or after them. Paez and Lobo visited the sources of the Bahr el Azrek, or Abyssinian Nile, and Father Fernandez proceeded as far as Narea, about 8° N. lat. [TELLEZ.]

In Paraguay the Jesuits had an open field for the display of their abilities and principles. Their missionaries went to South America after the country had been devastated by the Spanish conquerors, who hunted the Indians like wild beasts. The Jesuits judged that the poor natives might be converted by milder means, and be made Christians and happy at the same time. They obtained from the court of Spain a declaration that all their Indian proselytes should be considered free-men, and that the Jesuits should have the government of the communities of converts which they should form in the interior of the country. And the Jesuits did form a flourishing community of Indian converts on the banks of the Paraguay and the Parana, who are said to have amounted to between one and two hundred thousand, and they governed them for a century and a half in peace and happiness, keeping them in the condition of docile but contented pupils, directing their labours, and instructing them in the useful arts, but not in the refinements or luxuries of Europe. There were no taxes or law-suits in Paraguay; each able-bodied man had a moderate task to perform, and the produce of their common labour provided for the wants of all. Writers of very different opinions, Raynal, Montesquieu, Robertson, Muratori, Southey, and others, have done justice to the paternal administration of the Jesuits in Paraguay.

Other accounts of that remarkable colony are found in numerous works, in the 'Letters from Paraguay,' in the various histories of the 'Jesuits' Missions,' &c. And it is a remarkable instance of political injustice, that the very benefits which the Jesuits were imparting to mankind in South America should have been made the cause or pretext for their ruin. In 1750, Spain, by a treaty with Portugal, thought proper to give up seven districts of Paraguay to the latter power, in exchange for a territory which the Portuguese had occupied on the left bank of the river La Plata, and the Spanish government ordered the Jesuits and their Indian pupils to abandon their homes and remove to some other part of the Spanish territories. The fathers in vain remonstrated against the injustice and cruelty of expelling men from the fields which they had by their labour reclaimed from the wilderness; the harsh mandate was repeated, and the Jesuits were prepared to obey. But the natives refused to submit, and resisted the Portuguese and Spanish forces which were sent against them, and although a subsequent change in the diplomatic relations of the two countries left the Indians in possession of their country, yet the Jesuits were falsely accused of having encouraged what was styled the rebellion. The Spanish government, after mature investigation, acquitted them, but the Portuguese minister Pombal, a harsh and unprincipled man, believed or affected to believe in the rebellious spirit of the fathers, whom he wished to expel from Portugal, because he was jealous of their influence, and had found them repeatedly in the way of his plans and schemes at home. An attempt by some noblemen to murder the king, Joseph of Portugal, was charged upon the Jesuits, because Father Malagrida, one of the Society, was the confessor of some of the guilty.

As proof however could not be obtained against him, Father Malagrida was accused of heresy, on account of some ascetic visionary works which he had published, was condemned by the Inquisition, and executed; and in September, 1759, the minister, in the king's name, gave an order for the expulsion of the Society from the Portuguese territories and for the confiscation of their property. The order was executed with the greatest inhumanity both in Portugal and Brazil, the fathers being shipped off with indecent hurry, like so many cattle, on board ships bound for Italy, where they were landed in a state of utter destitution.

France followed next in the same course of proscription. The Jesuits had made themselves many enemies in that country by their long and bitter persecution of the Jansenists, and their controversies with that sect had brought much obloquy upon their institutions and moral principles. [JANSENISM.] Pascal, in his 'Lettres Provinciales,' had assailed them with ridicule, which has always proved most powerful in France. The parliament of Paris felt an old and hereditary hostility towards them: the minister Choiseul disliked them on personal and political grounds; he had felt and ascertained that their secret influence could often thwart and balance the credit of any minister; besides which, Choiseul was partial in a certain degree to some of the free-thinking philosophers of his time, who had no sympathy for the Society. To crown all, even the king's mistress, Madame de Pompadour, arrayed herself against the Jesuits. That intriguing woman wished to remain at court under some more decorous name than that of concubine to Louis XV. She solicited the appointment of lady of honour to the queen, and in order to strengthen her application she chose for her confessor Father De Sacy, a Jesuit who had a reputation for exemplary conduct. She pretended that she had dropped all intercourse with the king, and that she was really penitent. De Sacy however did not allow of any equivocation: he told the lady that if her penitence were sincere, she must quit the court altogether, as La Vallière had done under Louis XIV. The result may be easily guessed. Madame de Pompadour left the too rigid Jesuit, remained at court, and from that moment became a declared enemy to the order. Thus the strict morality of a member of that Society, which has been often charged with being too lax and accommodating, contributed to its ruin. A pretence soon occurred for effecting it. Father Lavalette, who was at the head of the missions in the French West Indies, had been speculating in colonial produce. His cargoes were seized by the English, then at war with France. Father Lavalette became a bankrupt for 3,000,000 livres. His creditors in France appealed to the parliament of Paris, which, having seen in the constitutions of the Society that no individual belonging to it could possess property on his own account, considered Father Lavalette's debt as that of the whole body, and condemned the Society to pay the creditors. An immense outcry was raised against the Jesuits, and the parliament in 1762 declared that an independent body like the Society, having peculiar laws, and being all subject to one individual residing at Rome, was an institution dangerous and unfit for any well regulated state; the other parliaments made similar declarations, and the partisans of the Jansenists, the philosophers, the courtiers, and the minister, all echoed the denunciation. At last, in 1764, by an order of the king, the Society was entirely suppressed in France, and their property was confiscated; but a small pension was given to the members, who were allowed to remain dispersed in the country, on condition of swearing to renounce the Society and its institutions.

Their fall in Spain took place three years later. Choiseul is said to have contributed to it by persuading the honest but credulous Charles III. that an insurrection which broke out at Madrid in 1766 against the minister of the day was the work of the Jesuits. D'Aranda, the president of the council of Castile, already prepossessed against the Society, was the confidant of King Charles in affecting their expulsion. The Society was feared, perhaps more than there was need, and everything was planned against them with the greatest secrecy. The king with his own hand wrote letters to all the governors of provinces throughout the Spanish monarchy in Europe and in the colonies, which were not to be opened until a specified day and in a specified place. When the appointed time came, the 31st of March, 1767, the colleges and houses of the Jesuits throughout Spain were surrounded at midnight by troops, sentinels were posted at every door, the bells were secured, and king's commissioners having roused and assembled the respective communities in the refectory, read to them aloud the royal decree which expelled them from Spain. The members, having taken their breviaries, some linen, and a few other conveniences, were placed in carriages and escorted by cavalry to the coast, where they embarked for Italy. After being refused admittance in several harbours, and kept for some months on board crowded ships, during which many of the aged and infirm died, the survivors were at last landed in Corsica.

Similar measures were executed in Spanish America, only with circumstances of still greater harshness. In Paraguay the Indians were amazed and distracted at the news, and would have opposed by force the execution of the decree, but here the fathers gave a noble example of fortitude and resignation, which was an answer to all former charges brought against their Society. These men, represented as so ambitious, so worldly, so intriguing, so refractory towards the civil power—these men, who in Paraguay at least possessed an unbounded influence over their flocks, exerted all that influence to appease the enraged Indians, and to induce them to submit quietly to the royal decree. No more than 9000 dollars, about 2000*l.* sterling, were found in their coffers.

By a compromise between the pope and the king of Spain, the latter allowed a pension of a shilling a day to the expelled fathers; but on condition that no apology of any sort should be written by any member of the order, under pain of all losing their pensions.

In the following year, 1768, the king of the two Sicilies and the duke of Parma suppressed the Jesuits' Society in their dominions. It still continued in the Sardinian and the Papal states; but in February, 1769, their supporter Clement XIII. died, and Ganganelli was elected in his stead. France, Spain, Portugal, Naples, all insisted, in very strong terms, on the final suppression of the Society by the new pope. Ganganelli proceeded with caution; he took three years to consider the matter. He appointed a congregation of five cardinals to examine the charges brought against the Society. At last, on the 21st of July, 1773, the pope issued a bull, in which, after descanting on the laudable object of the founders of the Society, and on the services it had rendered to religion, he observed that on many occasions a spirit of discord had broken out between them and the other ecclesiastical authorities, that many serious charges had been brought forward against individual members, who seemed to have deviated from the original spirit of their institutions, that, lastly, most Catholic princes had found it necessary for the peace of their dominions to expel the Jesuits therefrom, and that now, for the peace of the Christian world, and being moved by the most weighty considerations, and considering that the Society of Jesus could no longer bring forth those fruits of piety and edification for which it was intended, he declared the said Society to be suppressed and extinct, its statutes annulled, and its members who had been ordained priests to be considered as secular priests, and the rest to be entirely released from their vows. He allowed those professed members who were old and infirm, to remain in the houses of the extinct Society, but merely as guests, without interfering in their future management, which was entrusted to commissioners.

In consequence of this bull, the Jesuits were likewise suppressed in the Sardinian monarchy, in the Austrian dominions, and in every Catholic state. Two powers only, Prussia and Russia, one Protestant and the other Greek schismatic, allowed the fathers an asylum in their dominions, and continued to entrust them with the education of their Catholic subjects.

At the time of the first expulsion of the Jesuits from Portugal, in 1759, the Society reckoned altogether 22,589 members, half of whom were priests. They had 24 professed houses, 669 colleges, 176 seminaries, or boarding-houses, 61 noviciate houses, 335 residences, and 273 missions. Their principal professed house, in which the general resided, was a vast building attached to the splendid church of the Gesù at Rome. They had besides the Roman college and church of St. Ignatius in the same capital, several other colleges and seminaries for boarders of various nations, a noviciate house on the Quirinal, a seminary and college at Frascati, a house at Tivoli, and numerous other colleges and schools in the Papal states. All these, after the suppression of the Society, were entrusted to secular priests

and professors, but still the method and the discipline of the Society were in most instances continued, being found too useful to be abrogated.

The general of the Society, Father Ricci, was confined in the castle of St. Angelo, being suspected of still assuming in secret his former authority over the dispersed Jesuits, and also, but apparently without foundation, of having concealed sums belonging to the Society. Nothing however having transpired against him, he was treated with some courtesy and attention, but was kept in confinement till his death, in November, 1775. On his death-bed, before receiving the sacrament, he signed a solemn though mild protest on behalf of the extinct Society, the conduct of which, he said, to the best of his knowledge, had not afforded grounds for its suppression, nor had he himself given any reason for his imprisonment: he ended by forgiving sincerely all those who had contributed to both. His remains were buried with all due honour in the church of the Gesù, among those of his predecessors.

After the Society had been suppressed for about 30 years, several attempts were made at the beginning of the present century to re-establish it. Many persons in high stations, frightened at the convulsions which agitated the world, imagined that had the Jesuits continued they might have proved a powerful means for maintaining order and preventing revolutions by the moral influence which they had over youth. In 1801, Pius VII. issued a brief, allowing the Jesuits of Russia to live as a Society, and to have colleges and schools. Another brief, dated 30th July, 1804, allowed, at the request of king Ferdinand of Naples, the opening of schools and colleges by the Jesuits in the kingdom of the Two Sicilies. Lastly, after his restoration, Pius VII. issued a bull, in August, 1814, solemnly re establishing the Society as a religious order, under the constitutions of St. Ignatius, and under obedience to the general chosen by it, to be employed in educating youth in any country of which the sovereign shall have previously recalled or consented to receive them; and Pius began by restoring to them their house of the Gesù, and afterwards the Roman college. The Jesuits have colleges now also in the Sardinian states, in Modena, and in the kingdom of the Two Sicilies, and likewise at Freyburg in Switzerland, where they have a fine college, attended by pupils from France and other countries. In France they had re-introduced themselves in a kind of clandestine manner after the Restoration, upon which a great outcry was raised, and they were finally expelled in 1830. Both the expectations of their friends and the fears of their enemies appear to have been exaggerated, as circumstances have changed too much in Europe to allow the Jesuits to resume anything like their former influence. In Spain Ferdinand restored them, but after his death the populace of Madrid, excited by the declamations of the ultra-liberals against the monks, took it into their heads, during the prevalence of the cholera, that the Jesuits and other monks had poisoned the springs. Under the influence of this delusion they repaired to the convents, and particularly to that of the Jesuits, and murdered the inmates in their cells. Since that time the legislature has suppressed all monastic institutions in Spain.

In Russia the Jesuits were expelled by a ukase of the emperor Alexander, in June, 1817, upon the charge of intriguing and of making proselytes among the members of the established Greek church.

The act of the 10th Geo. IV., c. 7, which is entitled 'An Act for the Relief of his Majesty's Roman Catholic subjects,' forbids Jesuits, or members of other religious orders, communities, or societies of the Church of Rome, bound by monastic or religious vows, from coming into the realm, under pain of being banished from it for life; except natural born subjects, who were out of the realm at the time of the passing of the act. Such religious persons may however enter the United Kingdom on obtaining a licence in writing from one of the principal secretaries of state, who is a Protestant, and may stay such time as such secretary shall permit, not exceeding six months, unless the licence is revoked before the end of the six months. The act also makes it a misdemeanor in any Jesuit, or member of other religious body described in the act, to admit, or to aid in or consent to the admission of, any person within the United Kingdom to be a member of such body; and any person admitted or becoming a Jesuit, or member of other such body within the United Kingdom, shall, upon conviction, be banished from the United Kingdom for life. It is however provided that nothing in this act shall affect any religious order, community, or establishment consisting of females bound by religious or monastic vows.

Of the bitter polemics and the multifarious charges against the Jesuits we have not space here to speak at any length, but we will refer our readers to the principal works among a most voluminous mass of writings, both in attack and defence of the Society. The polemical works on this subject are innumerable, but a good history of the Jesuits is still wanted. The 'Histoire Générale des Jésuites,' by La Coudrette, is a work of considerable research and extensive information, but the author was a party writer against the Society; and his own assertions, whenever they are not supported by authentic proofs, must not be implicitly trusted. 2. The famous 'Lettres Provinciales,' by Pascal, had great success at the time, but the charges which he brought against the Jesuits, though founded upon the notions of some individual casuists belonging to the order, cannot in fairness bear against the body of the Society, which did not countenance their extravagant doctrines. Voltaire himself, no friend to the Jesuits, acknowledged this; and Father Daniel, in his 'Entretiens de Cléandre et d'Eudoxe,' has refuted most of Pascal's arguments. 3. Arnauld, a polemical writer of the Jansenists' party, wrote 'La Morale Pratique des Jésuites,' in which also charges against individuals are construed into general charges against the whole Society, and some real facts and documents are mixed up with party bitterness and exaggeration. 4. 'Extrait des Assertions dangereuses et pernicieuses en tout genre que les soidisant Jésuites ont, dans tous les tems, perseveramment soutenues, enseignées, et publiées dans leurs livres, avec approbation des Supérieurs et Généraux.' This book seems to come directly to the purpose by appealing to numerous passages extracted from Jesuit writers. But then there is a 'Réponse aux Assertions,' in 3 vols. 4to., 1763, in which the author of the previous work is charged with no less than 758 falsifications and alterations of the texts quoted by him, and the advocate of the Jesuits produces in every instance the original text and confronts it with the corresponding one in the assertions. In order to judge correctly one ought to refer to the original works. These are the most weighty authorities against the Jesuits. Among the defenders of the Society must be mentioned 'Apologie de l'Institut des Jésuites,' 2 vols. 8vo., which is a standard work in their defence. Numerous declamatory works and satirical pamphlets have been published against the Society, most of which are contemptible in point of argument. The famous 'Monita Secreta,' or pretended private instructions given to the higher and most tried members of the order, are now generally acknowledged to be spurious. The more substantial charges brought against the Society may be classed under the following heads:—1. Antisocial and immoral principles found in some works of Jesuit casuists, such as Escobar, Mariana, Sanchez, Bauny, Busenbaum, &c. It does not appear however that the Jesuits in general, either individually or as a body, acted upon these obnoxious principles, which, on the contrary, were censured and repudiated by the Society. The doctrines of their most illustrious moralists, of Father Bourdaloue, of Cardinal Sforza Pallavicino, of Bellarmino, and others, are free from such stains. 2. General latitudinarianism in the ethics and moral practice of the Jesuits, not so much with regard to their own conduct, which, with very few individual exceptions, is acknowledged to have been pure and freer from scandal than that of most other monastic orders, but with regard to the lay persons whose consciences they directed, or to their proselytes in distant countries, such as China, where they are accused of winking at several superstitious and idolatrous practices among the new converts, and for which they were in fact censured by the pope himself. [CLEMENT XI.] Their doctrine of probabilism, their attaching too great an importance to the merit of good works, and their bias towards casuistry and equivocation, have been often animadverted upon. 3. Great ambition of ruling over the consciences of the people. The institutions and practice of the Society certainly tended to keep the world in subjection, by means of early discipline and persuasion, to the spiritual authority of the Roman Catholic church, and to the temporal authority of the respective sovereigns. That this should have excited the animosity of those who dissented from that church, of which the Jesuits were the firmest support—that the Protestants for instance should have had no friendly feeling for their

most formidable enemies, is nothing surprising or unreasonable; that the free-thinking philosophers of the eighteenth century, who railed at Christianity altogether, should have railed at the Jesuits, was a thing to be expected, as well as that persons of democratic feelings, or who wished to introduce the popular element into the constitutions of the European states, and who advocated an individual liberty of thought and action, should have rejoiced at the fall of the Society; and lastly, that the Jansenists, whose principles of ethics and whose notions of ecclesiastical discipline differed totally from those of the Jesuits, should have had frequent and bitter quarrels with the latter, is not surprising,—but that sincere Roman Catholics, priests, monks, bishops, and cardinals, and, lastly, a pope himself, should have aimed at and effected the destruction of an order which asserted the duty of subjection to the pope; that absolute Catholic monarchs should have proscribed the Jesuits, whose precepts tended to keep the people docile and obedient to the temporal power,—this is a singularity which must strike every dispassionate observer of the events of the eighteenth century, and which can only be accounted for by the agency of a variety of remote or hidden causes, and of personal passions and momentary interests which often prevail in the councils of princes. The Jesuits made proselytes; but this was in conformity to the spirit and received practice of their church: they preached perfect obedience to the decisions of that church and of its head the pope; but in doing this they followed the established Roman Catholic doctrine. Bossuet, who was no Jesuit, defines 'a heretic to be one who has his own opinion, and follows his own judgment and sentiment in matters of religion; while a Catholic, on the contrary, adopts without hesitation the opinion of the church.' And the Jesuits acted and taught in conformity with this principle.

It is true that the Jesuits' notions of papal authority went farther than those of the Gallican church, but it is also true that the provincials of the Jesuits in France and all their subordinates in that kingdom recognised in solemn instruments the civil independence of the sovereign, and that the four articles of the Gallican church were taught in all the schools of the French Jesuits; and in the year 1761 the French Jesuits signed and transmitted to the chancellor Lamoignon a declaration to the effect—'1. That they held and professed that in no circumstance or place, under no pretence of tyranny or vexation, on no account of religion, is it lawful for any person, whatever be his state or condition, to make any attempt, directly or indirectly, against the person of sovereigns, or to insinuate or favour any act that can tend to endanger their safety, and that they condemn and detest as execrable any doctrine to the contrary which may be found in any works that may have been composed, either by any member of the Society, or by any other person. 2. They hold and profess the doctrine of the clergy of France declared in their Assembly of 1682, and that consequently they will always teach that the power given to St. Peter, to his successors, and to the church itself, is purely spiritual, and that they have no power over anything that concerns temporals. 3. That they will always be subject to the laws, ordinances, regulations, and usages of the kingdom, in the same manner as all other subjects of the king; and that they will not attempt anything contrary to the rights of the bishops, curates, and universities, or make any use of any privilege, whatever it may be, except in so far as it is conformable to the import of the laws and maxims of the kingdom. 4. That if it should happen (which may God forbid) that they should be ordered by their general, or by any other person invested with any authority, to do anything contrary to the laws of the church or the state, to their duty to their sovereigns, or to the public welfare or tranquillity, they declare that they hold and ever will hold such decrees or orders to be null, and consider themselves obliged to disobey them.' (*Réponse aux Assertions*, vol. iii., p. 597.) Still as these were not the original principles of the Society, nor conformable to the spirit of its constitutions, and as it could not be expected that they would be assented to by the Society at large, the suspicions engendered in the minds of sovereigns and their ministers certainly contributed to the downfall of the Jesuits. Their devotion to the pope injured them with the sovereigns, and then the sovereigns induced a pope to forsake them also. The other monastic orders were jealous of them, and the bishops and parochial clergy disliked them as too independent a body. It ought also to be observed that the Jesuits, though professing to be devoted subjects to the Roman see, were not always very manageable subjects, and that several popes, Clement XI., Innocent XI., Innocent XIII., and Benedict XIII. found them at times refractory. They were in reality too powerful even for the pope to meddle with.

A fresh charge against the Jesuits was their accumulating riches, and such suspicion probably stimulated the zeal of several ministers and courtiers against them; but the fact is, that at the suppression of their order, after the most minute inquisition, no treasures were found, no hoarded funds: several of the houses and colleges were encumbered with debts, and the expelled members of the Society lived the rest of their days in a state bordering upon indigence.

During two centuries and a quarter which elapsed from their foundation to their suppression, the Jesuits rendered great services to education, literature, and the sciences. Throughout all Roman Catholic states they may be said to have established the first rational system of college education. Other orders, such as the Fathers of the Christian Doctrine, instituted in 1571, the Clerici Scholarum Piarum, in 1617, and the Brothers of the Christian Schools, or Ignorantins, in 1679, applied themselves more especially to the elementary education of children, though the Jesuits also did not altogether neglect this branch. The colleges of the Jesuits were equally open to the noble and the plebeian, the wealthy and the poor: all were subject to the same discipline, received the same instruction, partook of the same plain but wholesome diet, might attain the same rewards, and were subject to the same punishments. In the school, the refectory, or the play-garden of a Jesuit's college, no one could have distinguished the son of a duke from the son of a peasant. The manners of the Jesuits were singularly pleasing, urbane, and courteous, far removed from pedantry, moroseness, or affectation. Their pupils, generally speaking, contracted a lasting attachment for their masters. At the time of their suppression the grief of the youths of the various colleges at separating from their teachers was universal and truly affecting. Most of the distinguished men of the eighteenth century, even those who afterwards turned free-thinkers, and railed at the Jesuits as a society, had received their first education from them; and some of them have had the frankness to acknowledge the merits of their instructors. The sceptical Lalande paid them an honest tribute of esteem and of regret at their fall: even Voltaire spoke in their defence. Gresset addressed to them a most pathetic valedictory poem, 'Les Adieux.' The bishop De Bausset, in his 'Vie de Fénélon,' has inserted a most eloquent account of the Institution of the Jesuits, of their mode of instruction, and of the influence which they had, especially in the towns of France, in preserving social and domestic peace and harmony. For the Jesuits did not exclusively apply themselves to the instruction of youth; grown-up people voluntarily sought their advice concerning their own affairs and pursuits in life, which they always freely bestowed; they encouraged the timid and weak, they directed the disheartened and the forsaken towards new paths for which they saw that they were qualified; and whenever they perceived abilities, good will, and honesty, they were sure to lend a helping hand. The doors of the cells of the older professed fathers were often tapped at by trembling hands, and admittance was never refused to the unfortunate. In private life at least, whatever may have been the case in courtly politics, their advice was generally most disinterested. It has been said that they excelled in the art of taming man, which they effected, not by violence, not by force, but by persuasion, by kindness, and by appealing to the feelings of their pupils. If ever mankind could be happy in a state of mental subordination and tutelage under kind and considerate guardians, the Jesuits were the men to produce this result; but they ultimately failed. The human mind is in its nature aspiring, and cannot be permanently controlled: it cannot be fashioned to one universal measure; and sooner or later it will elude the grasp of any system, whether military or political, ecclesiastical or philosophical, and will seek, at any cost, to gratify its instinctive desire for freedom.

Among the members of their own society the Jesuits have had distinguished men in almost every branch of learning. In the mathematical sciences we may mention, among others, Jacquier, Le Sueur, Boscovich, and Le Maire; in classical literature, Petau, Sirmond, Jouvency, Lagomarsino, Tursellini, &c.; in general literature, Possevin, Bettinelli, Tiraboschi; in ecclesiastical learning and sacred oratory, Bellarmino, Pallavicino, Segneri, Bourdaloue; in

Oriental philology, Kircher, Ignazio Rossi, Amiot, Gaubil, &c. The 'Fasti Societatis Jesu,' the 'Acta Sanctorum S. J.,' the numerous letters and memoirs of the various missions, may be consulted in order to judge of the value of Jesuit learning and labour.

JESUITS' BARK. [CINCHONA.]

JESSULMER. [HINDUSTAN, p. 221.]

JESUS. [CHRIST.]

JESUS, son of Sirach, was a learned Jew of Jerusalem, who employed himself in collecting sayings of wise men, from which, with additions of his own, he formed the book of ECCLESIASTICUS. (*Ecclesiasticus*, ch. l., ver. 27.) We know little of him but what we can gather from that book. According to Bretschneider, he composed it about 180 B.C.; a date which is rendered probable by the fact that, in enumerating the illustrious men of the Hebrew nation, the last he mentions is the high-priest Simon, the son of Onias, of whom he speaks in terms which make it probable that he had seen him; while he does not mention the Maccabees.

Another Jesus, a grandson of the former, and whose father's name is also supposed to have been Sirach, translated the book of Ecclesiasticus into Greek, probably about 130 B.C.; for he states in his prologue to the book that he went into Egypt in the reign of Euergetes (Ptolemy VII., Euergetes II.), and there executed the translation.

This is the general opinion; but Jahn thinks it probable that Jesus composed the book of Ecclesiasticus about B.C. 292—280; that the Simon, son of Onias, whom he praises, was the first of that name, not the second; and that his grandson executed the translation under Ptolemy Euergetes I., who reigned B.C. 247—222. He founds this opinion chiefly on the character of Simon I. agreeing with the eulogy of the writer better than that of Simon II.

(Bretschneider, *Liber Jesu Siracidæ*; Horne's *Introduction*, vol. iv.; Jahn, *Introd. in Lib. Sac. Vet. Fœd.*)

JESUS COLLEGE, CAMBRIDGE, was founded in 1496, by John Alcock, bishop of Ely, who had obtained from King Henry VII. a grant of the nunnery of St. Radegund, then lately suppressed; all the lands which had been bestowed upon that monastery were given as an endowment, and the buildings were converted into a college. It has sixteen foundation fellowships, open to natives of England and Wales, without any restriction or appropriation whatsoever; five of the original foundation, four founded by Dr. Fuller, master of the College, and the rest by various benefactors. Six of the fellows are required to be in priests' orders. On every vacancy of a fellowship the master and fellows nominate two candidates, of whom the bishop of Ely elects one. There is one fellowship, founded by James Stanley, bishop of Ely, to which the bishop has an exclusive right both to nominate and appoint. The mastership of this College is in the absolute appointment of the bishop of Ely. Various scholarships, exhibitions, and smaller foundations, of different annual values, from 70*l.* to 3*l.* 6*s.* 8*d.*, have been bestowed on this College from time to time by different benefactors. It has also some annual prizes of value. The total number of members upon the boards of this College, on March 12, 1838, amounted to 179. Its patronage consists in the rectories of Graveley and Harlton in Cambridgeshire, of Stanley Regius in Gloucestershire, Tewing in Herts, and Cavendish and Whatfield in Suffolk; and in the vicarages of All Saints and St. Clement's in Cambridge, those of Comberton, Fordham, Guilden Morden, Hinxton, Swavesey, and Whittlesford, in Cambridgeshire; of Elmstead in Essex, and of Hundon in Suffolk. (Lysons's *Cambridgeshire*, pp. 118, 119; *Camb. Univ. Calendar* for 1838.)

JESUS COLLEGE, OXFORD, owes its foundation to the zeal of Hugh ap Rice, or Price, a native of Brecknock, who, when far advanced in life, meditated the establishment of a college which should extend the benefits of learning to the natives of Wales, an advantage which, previous to his time, had not been provided for at Oxford. With this intention he petitioned Queen Elizabeth that she would be pleased to found a college on which he might bestow a certain property. Her Majesty accordingly granted a charter of foundation, dated June 27, 1571, prescribing that the college should be erected by the name of 'Jesus College, within the City and University of Oxford, of Queen Elizabeth's foundation;' the Society to consist of a principal, eight fellows, and eight scholars; and for their maintenance Dr. Price (for he had now become a Doctor of Civil Law) was permitted to settle estates to the yearly value of 160*l.* To this the queen added a quantity of timber from her forests of Shotover and Stow. The founder's estates, which he conveyed June 30, lay in Brecknockshire; and he bestowed upwards of 1500*l.* upon the building, leaving besides some money, which was suffered to accumulate, and which, in the beginning of the seventeenth century, amounted to 700*l.* Hugh Price, who was a prebendary of Rochester and treasurer of St. David's, died in August, 1574. In 1589 the Society procured another charter of the queen, empowering them to hold possessions to the value of 200*l.* per annum, and to appoint commissioners for the drawing up of statutes.

King Charles I. in 1636 founded a fellowship to be held by a native of Guernsey or Jersey; Bishop Westphaling and Sir John Walter founded one for a native of England; Bishop Rowlands, Dr. Francis Mansell, Dr. Thomas Gwynne, and others, added fellowships and scholarships for natives of different districts of Wales, or for schools in the principality; and Sir Leoline Jenkins, who was almost a second founder, bequeathed to the College divers lands and tenements for augmenting the then sixteen fellowships and sixteen scholarships, and for founding two additional fellowships and scholarships. One fellowship was afterwards added, by a decree in chancery, out of the residue of Sir Leoline's personal estate. So that the Society at present consists of a principal, nineteen fellows, and eighteen scholars.

Several exhibitions have likewise been founded by different benefactors, of which twenty-four are for natives of North Wales, by the Rev. Edmund Meyrick, M.A., treasurer of St. David's; three for Caermarthenshire, by Bloom; two for Brecknockshire, or Radnorshire, by Powell; one for a native of Ruthin, or diocese of St. Asaph, by Bishop Parry; one for Caernarvonshire, by subscription, to be called Mr. Assheton Smith's; two by Le Hunt; four by the Grocers' Company; two by the Salters' Company; and some connected with the Cowbridge School foundation by Sir Leoline Jenkins.

The patronage of this College consists in the rectories of Longworth and Remenham in Berks; of Ashton Clinton in Buckinghamshire; of Bagendon, or Badgington, in Gloucestershire; Scarthe in Lincolnshire; Brandeston and Furthoo in Northamptonshire; Rotherfield Pipard and Wiginton in Oxfordshire; Nutfield in Surrey; Tudington in Worcestershire; Llandyssil in Cardiganshire; Clynnog Vawr and Llan Wuda in Caernarvonshire; and Llandon in Glamorganshire; with the vicarages of Shipston-cum-Tidmington in Worcestershire, and Holywell in Flintshire; the impropriation of Badgworth, and the chapelry of Charlton Kings, in Gloucestershire; and the impropriations of Holyhead, Bodedern, and Llandrygarn with Bodwrog, in Anglesey.

The present number of members upon the books of this College is 149.

(Gutch's *Colleges and Halls*; Chalmers's *Hist. of the Univ.*; *Oxford Calendar*, 1838.)

JET, a variety of coal, which occurs sometimes in elongated reniform masses, and sometimes in the form of branches, with a woody structure; fracture conchoidal; soft and brittle; sp. gr. but little greater than that of water; lustre brilliant and resinous; colour velvet black; opaque. It is found in Saxony, and also in the Prussian ambermines, in detached fragments. The finer sorts are used for the manufacture of ornaments and trinkets, and the coarser kinds as fuel; it burns with a greenish flame and a strong bituminous smell, and leaves a yellowish ash.

JETHOU. [GUERNSEY.]

JETSAM. [FLOTSAM.]

JEWELL, JOHN (born 1522, died 1571), one of the fathers of the English Protestant church. He was born in Devonshire, and educated in grammar-schools in that county, till at the age of thirteen he was sent to Oxford, where he was entered at Merton College, under the tuition of John Parkhurst, who was afterwards the Protestant bishop of Norwich. When eighteen, he was admitted B.A., and at that early age he became a college tutor. Henry VIII. was still upon the throne, and it was hazardous for any one to make himself conspicuous either as an opposer of the principles of the Reformation or as an advocate of them. Jewell therefore kept himself quiet, contenting himself with inculcating Reformation principles privately in his lectures to his pupils; but when King Henry was dead, and the ecclesiastical policy of the country became more decidedly

Protestant under his successor, Jewell declared himself openly a zealous Protestant; and when Peter Martyr, one of the foreign reformers, visited Oxford, and there held a public disputation (as was the manner of those times) with certain learned Catholic divines, Jewell acted as his notary. From this time he became a zealous promoter of the Reformation, both at the university and as a preacher and catechiser in the country about Abingdon, where he had a living.

Times however changed; King Edward died, and a new policy was adopted. It was sought to undo what had been done. Jewell, it seems, for a short time somewhat temporized; but he very soon recovered himself, and sought shelter in a foreign land from the severity of the storm which fell upon those who, in the preceding reign, had been zealous for the Reformation. He joined the English exiles at Frankfort, and afterwards at Strasburg, where he again met with Peter Martyr, whom he assisted in the composition of some of his works. The reign however of Mary was short, and with the accession of Elizabeth came brighter prospects to the friends of reform. Jewell returned home, and was almost immediately made bishop of Salisbury. His zeal was not relaxed. He continued both by his preaching and his writing to promote the doctrines of the Reformation, and to endeavour to extinguish whatever attachment there might still remain, especially in any part of his own diocese, to the older system. He died, in the course of one of his preaching tours, at the little village of Monkton Farleigh, in an obscure corner of his diocese, in the fiftieth year of his age. Camden, whose testimony is worth more than that of any party writer on either side, bears to him this testimony, that he was a man of singular ingenuity, of vast erudition in theology, and of eminent piety.

The writings of Jewell are chiefly controversial, the most remarkable of them being his 'Apology for the Church of England,' and his various Defenses of that Apology. These are together considered one of the ablest defences of the Protestant Church of England that appeared, and were translated into many languages for the purpose of circulation abroad. His writings were collected in a large folio volume in 1609. Copies of this volume were placed in many of the English churches for the common use of the parishioners, and may sometimes even now be found fastened by a chain to a reading-desk. This honour it has shared with Fox's 'Acts and Monuments of the Church,' and some of the theological writings of Erasmus.

The writings of Jewell are still greatly valued, and are much used in two departments of ecclesiastical controversy, the question between the Church of England and the Church of Rome, and the question respecting the doctrinal sentiments of the fathers of the Protestant Church of England. Lists of his writings may be seen in the 'Athenæ Oxonienses' of Anthony Wood, where is an outline of his life, the particulars of which have been written more in detail by many persons.

JEWELLING OF WATCHES is the art of setting diamonds, rubies, sapphires, chrysolites, or other hard stones, in the frame-plates and other parts of watches, in such a manner that the pivots of the watch may act in holes made in these stones. There are two kinds of jewelled holes necessary in watches, one of which is merely a perforation through the stone; the other consists of a perforated piece, and a piece called an end-piece. The latter mode of jewelling is adopted where it is necessary that the end of the pivot, and not the shoulder, should sustain the weight of the wheel whenever by a change of place it is brought into a vertical position, which is important in those cases where the pivot has a rapid motion and considerable weight to sustain, as the pivots at each end of the axis of the balance.

The province of the watch-jeweller is to select the stones, and, except in the case of diamonds, to grind, polish, turn, drill, and set them into the frames or other parts of the watch in such a manner that the holes in the stones may correspond exactly in position with holes previously made by the watch-finisher or escapement-maker. Jewelling is an operation which when well performed adds materially to the durability, and not a little to the elegance of the machine. A hole without an end-piece is thus made: the hole in any piece to be jewelled having been made in its proper place by the finisher, the piece is so fixed in a lathe by the jeweller that the hole shall be perfectly concentric to the centre of motion; this hole is then enlarged by turning, and afterwards so formed that a small circle of brass which contains the stone, and which is called the setting, may have a cavity to rest in, without the possibility of its going through the plate, or piece in which the hole has been made. After the setting has been fitted to the cavity, and adjusted so as to be flush with the plate, two screws are inserted in the plate so near to the cavity which contains the setting that the edges of the screw-heads project a small distance over the edge of the setting, and thereby secure it in its place. When a hole with an end-piece is required, the same process is adopted, but two stones are required for each hole instead of one, and the first or perforated stone with its setting is sunk into the cavity already described a sufficient distance below the surface of the plate to allow of the reception of a second setting, containing a stone which resembles in form a small slice cut from a sphere about the size of a shot, its form being plano-convex. The edge of this second setting is left flush with the plate or piece in which the cavity is made, and two screws being inserted, as in the former case, the two settings are secured at once. It must be remembered that the stone last inserted has no hole through it. The mode of forming the stones, &c. will be presently described, but it will be as well to observe here, that in the holes already described the stones are secured in their brass settings in a manner somewhat similar to that in which opticians set many of their glasses in telescopes, namely, by turning a place to receive the stone, and leaving a fine edge of brass, which is subsequently rubbed over the edge of the stone with a burnisher. Jewelling has sometimes to be performed in situations where there would not be room to insert the fastening screws without weakening the part, as in the foot of a watch potence. In this case the first stone is inserted with its setting into a cavity as already described, with the surface of the setting flush with the surface of the part into which it is placed, but the surface of the stone is so much lower than that of the setting as to allow of a dovetailed notch or slit being cut through it, and along the surface of that part which receives the setting, so that a small brass dovetail pushed tight into this groove or slit secures the setting in its place; and at that part of the dovetail which immediately covers the hole in the stone is inserted another small piece of stone, which forms an end-piece to the hole. When a diamond end-piece is used, it is usually set in steel, into which it is brazed, the diamond being a stone which will allow of heat sufficient for that purpose. After brazing, the steel is turned into shape, polished, and blued.

The apparatus necessary for the jeweller to carry on his business are a small lathe, the action of which in its collar should be as light as possible; small gravers for turning brass and steel; a quantity of rough diamond in fragments, technically termed *bort;* small mills or circular disks of metal (usually copper) for grinding the stones into shape; diamond-powder of various degrees of fineness for polishing; and turning tools made by cementing small pieces of bort into a notch made in the end of small brass wires and fixed in proper handles. In the preparation of a stone for a jewel-hole, it is necessary first to charge a copper disk about the size of a penny piece, and out of which it is frequently made with bort, which is done by strewing a quantity of it upon the copper, and by strokes and pressure from a hammer embedding it into the surface; the mill thus prepared is fixed unto the mandrel of the lathe, which is put in motion by a band from a rather large foot-wheel, the mill making from 6000 or 7000 to more than 20,000 revolutions in a minute, the latter velocity being given only in the act of polishing. The stone to be formed is then taken on the end of one of the fingers of the right hand and applied to the surface of the bort-mill, which is kept constantly wet with water applied by the fingers of the left hand, and in a few seconds a flat surface is produced on a stone of the most irregular form; the flat surface is then placed next the finger, and a similar surface is produced parallel to the former, until the stone is of such a thickness as is required; it is then placed, by means of cement, on a small chuck in the lathe, and with one of the before-mentioned bort tools turned into the proper shape for setting; the hole is also drilled either with a steel drill and diamond-powder and oil, or with a drill made of bort or small fragments of diamond. In drilling the hole it is necessary to drill the stone about half way through, after which the stone is reversed, and the drilling commenced on the opposite side, to prevent the fracture which would be likely to take place if the drill-

ing was continued through to the opposite surface. The piece of stone, or hole, as it is called, is also turned with a hollow or countersink to receive the oil necessary for the lubrication of the pivot. A piece of brass, one end of which is shaped to fit the hollow, is charged with fine diamond-powder, the finger being applied to the other end, and by pressing it against the stone, and at the same time by a motion of the finger giving every possible change of position to the brass which is compatible with keeping it in the hollow of the stone, from which it should not be suffered to slip, the stone is beautifully polished. The stone is afterwards detached from the lathe, and its flat or parallel surfaces polished by rubbing it with all the rapidity of which the hand is capable on a piece of plate-glass, previously charged with a small quantity of diamond-powder and oil. When an end-piece is required the same process is gone through, except that the drilling is omitted, and the spherical side of the stone is polished by using a piece of brass with a hollow end to suit the convexity of the stone. The jeweller also makes use of a small spirit-lamp to heat the cement when he applies it for the purpose of securing the stones upon the chucks in the lathe, and after one side of a stone has been made true by turning, and the hole drilled partly through the stone as before stated, it is reversed, and fixed perfectly true on the chuck by keeping the cement so warm that the stone may be moved by the pressure of a piece of wood or metal, which the workman makes use of for that purpose, by applying it to the edge or surface of the stone, as required, while the lathe is in motion. Another and very ingenious mode of changing the surface of the stone for the purpose of completing the operation of drilling without detaching it from the cement is the following:—A hollow chuck is made to fit upon the lathe, into the exterior edge, of which a groove is turned to receive a lid or cover, which is turned true, and so formed upon the edge that it will snap tight into the before-named groove with either of its sides outwards, a small piece being taken out of its edge to allow of the insertion of any small tool to remove the cover in the same way as the cover is removed from a watch-barrel. A small hole is made in the centre of this cover, over which the stone is cemented, and when the drilling on one side is completed, the cover, and with it the stone, is removed, and by snapping in the cover the contrary side outwards the other surface of the stone is presented to the operator, and the act of drilling is repeated; for the cover and groove being turned perfectly true, the centre of motion of the stone is not affected by the reversing of the cover.

The end-pieces, when real diamonds are used, are what are called rose diamonds, and are procured from Holland, where they are cut.

JEW'S-HARP, a musical instrument of the simplest and rudest kind, consisting of an iron frame, resembling in form the handle part of an old-fashioned corkscrew, in the centre of the upper and wide part of which is riveted at one end an elastic steel tongue, the extremity of which, at the free end, is bent outwards to a right angle, so as to allow the finger easily to strike it when the instrument is placed to the mouth and firmly supported by the pressure of the parallel extremities of the frame against the teeth.

Professor C. Wheatstone has shown that the sounds of the Jew's-harp mainly depend on the reciprocation of columns of air in the mouth of the performer, and that these sounds are perfectly identical with the multiples of the original vibrations of the instrument. Hence its scale must necessarily be very incomplete; but by employing two or more instruments, the deficiencies are supplied. A few years ago, an ingenious foreigner, M. Eulenstein, exhibited in London, at the Royal Institution, his very extraordinary talent on the Jew's-harp. He used sixteen instruments of different sizes, and was thus enabled to modulate into every key, and to produce effects not only original, but musical and agreeable.

JEWS (Ἰουδαῖοι and JUDÆI in Greek and in Latin), in its widest acceptation, is used as synonymous with Hebrews, or Israelites, but in a more restricted sense it means the inhabitants of the kingdom of Judæa as it existed in the time of Jesus Christ, and whose descendants are now scattered over all the world. The history of this people previous to the time of Christ is contained in the Old Testament and in Josephus. Their great ancestor Abraham, called 'the Hebrew' (*Genesis*, xiv. 13), by birth a Chaldæan, emigrated, about 1921 years B.C., with his wife Sarai, his nephew Lot, and his numerous servants and flocks, into the land of Canaan, the modern Palestine, where he settled. [ABRAHAM.] At an advanced age his wife bore him a son, Isaac, from whom the Hebrews are descended. Abraham's elder son Ishmael, whose mother was an Egyptian and a slave, settled in the wilderness of Arabia. Isaac married Rebecca, by whom he had two sons, Esau and Jacob, the former of whom was a hunter, and gave up his birthright to his younger brother Jacob. Jacob, surnamed Israel, or 'the strong' (*Genesis*, xxxii. 28), had twelve sons, namely Reuben, Simeon, Levi, Judah, Dan, Naphtali, Gad, Asher, Issachar, Zabulon, Joseph, and Benjamin. From these were descended the twelve tribes of Israel, or of the Hebrew nation. One of Jacob's sons, Joseph, came by a singular course of vicissitudes to be first minister to one of the Pharaoh kings of Egypt, and he settled his brethren in a fertile district of that country, where his and their descendants throve and multiplied so as to form in the course of about two centuries after Joseph's time a very numerous colony subject to the Egyptians, by whom they were disliked as aliens, and treated with great harshness. Being driven to despair, they found a leader in one of their countrymen, Moses, who, acting under the special direction of God, led them out of the land of Egypt, to return to that of their ancestors, Canaan, the possession of which God had promised to the posterity of Abraham. The number of the Israelites at their departure from Egypt is stated in *Exodus* (xii. 37) at six hundred thousand men, besides women and children, with their flocks and herds of cattle. Being pursued by the Egyptians, they crossed on dry land the northern extremity of the western of the two great gulfs in which the Red Sea terminates, now called the gulf of Suez, and entered the peninsula of Sinai, in Arabia. The waters of the sea, which, at the command of the Lord, had divided and made a passage for the children of Israel on dry land, returned at the same command, and overwhelmed their pursuers.

The departure of the Israelites from Egypt took place, according to most chronologists, in 1491 B.C. [EXODUS.] On Mount Sinai Moses received from God the law of the Ten Commandments, and from that time the Israelites were taught to consider themselves as being under the immediate government of the deity, who, from time to time, made known his will to them through their leader Moses. The books of Moses called *Exodus* and *Leviticus* contain the civil laws and social regulations, as well as the rites and religious ceremonies. Other laws which were successively promulgated are found in the following books of *Numbers* and *Deuteronomy*, so as to form a complete body of institutions for the Hebrew community. Of these laws some were temporary directions suited only to the nomadic state in which the Israelites spent many years in the wilderness; others are enactments intended for an agricultural people with settled habitations, and for the time when they should become possessed of the promised land of Canaan. Sanitary regulations concerning diet, cleanliness, and decency form an important part of the code, and are admirably adapted to the people, country, and climate for which they were intended. The political system was founded upon equality, without any distinction of castes; the whole nation was to be one great body of husbandmen cultivating their own property. The land could not be alienated in perpetuity; every fiftieth year a jubilee was to take place, when all estates which had been alienated were to revert to their original owners, and all burthens, debts, and other engagements were to cease.

One tribe, the descendants of Levi, was set apart for religious service: they had no tract of country assigned to them, but were to dwell by themselves in separate towns or villages, scattered through the territory of the other tribes. Out of this class the officiating priesthood was chosen, as well as the scribes and keepers of records, the judges, and perhaps also the physicians. They were in fact the learned class of the nation; they read the law to the people, and they attended by rotation on the officiating priests in the Tabernacle. One-tenth of the whole produce of the land possessed by the other tribes was assigned to the Levites for their maintenance. Each tribe had its own chieftain or prince, and the heads or elders of each family constituted the provincial assembly. On occasions of great emergency, national assemblies were held, probably consisting of delegates from each tribe, and their resolutions were ratified by the general voice of the people expressed by acclamation. This took place repeatedly during their encampment in the

desert. All who could bear arms were bound to fight in the common defence. The penal laws were severe, but considerate; punishments were fixed for every offence; nothing was left to caprice. Parental authority was enforced, but the law prevented its abuse; the father had no power of death over his children, and he could not disinherit them; the first-born received two portions, and the rest shared equally. No Hebrew could be sold or sell himself as a bondsman for life; he might hire himself as a servant for a period, but at the end of six years he became free again, unless he chose to renew his term for another six years. Foreign slaves however, whether captives or purchased, were held in perpetual bondage, both they and their children; but the law provided for their protection: they were entitled to rest on the Sabbath, and on the great festivals they partook of the common feasts and rejoicings. The condition of a slave among the Hebrews was better than that of a slave among the Romans and most other nations of antiquity. For further details concerning the constitution of the Hebrews the reader is referred to the 'Pentateuch,' especially to the books of *Leviticus* and *Deuteronomy*.

The office of high-priest was bestowed upon Aaron, the brother of Moses, and his descendants in perpetuity. This dignity was quite distinct from that of civil leader or judge, though in course of time some high-priests occasionally united both offices in their persons. The high-priest was the means of communication between God and the people: he alone could enter the recess of the sanctuary; in important cases there was a final appeal to him; and he was also consulted upon great national affairs. He had the charge of the tabernacle or sanctuary, which was the great bond of union among the tribes of Israel.

After remaining about a year encamped at the foot of Mount Sinai, the Israelites marched towards the land of Canaan, and arrived at Kadesh Barnea on its southern frontier, whence they sent spies to explore the interior. After forty days the spies returned with the information that the country was rich and fertile, but the people fierce, numerous, and strong, and likely to make a stout resistance. The Israelites, long accustomed to bondage, were frightened, and they loudly demanded to be led back to Egypt. Moses saw that the people were as yet unfit for a war of conquest, and on the authority of God he gave the order for retreat, not however for Egypt, but back into the peninsula of Sinai, where they encamped and settled with their flocks and cattle after the fashion of the Beduin Arabs. In this wilderness they remained for thirty eight years, the period assigned for their nomade life, until the first generation which had come out of Egypt had gradually sunk into the grave, and a new race had sprung up in the free air of the desert, trained to the bold and hardy habits of the wandering Arab, but with much of the arts, knowledge, and discipline derived from Egypt. At the expiration of this time, they again moved forward to Kadesh, but Moses perceiving that part of the country to be mountainous and well defended, led them round the eastern shore of the Dead Sea through the land of Edom and Moab. He crossed the Jabbok, defeated the Amorites and the king of Bashan, and encamped in a plain near the left bank of the Jordan above its influx into the Dead Sea, nearly opposite to Jericho. Here, after defeating the Midianites and giving the conquered territory on the west of Jordan to the tribes of Reuben, Gad, and half the tribe of Manasseh, he prepared to lead the Israelites across the river. But before this was effected Moses died, after bestowing his last advice and blessing on the people, assembled for this solemn purpose, and appointing Joshua, a man already tried for his bravery and skill, to be his successor. Joshua crossed the Jordan and took Jericho, and gradually conquered the greater part of Canaan, exterminating or driving away the former inhabitants. The events of the conquest are related in the book of *Joshua*. The country was then divided among the twelve tribes, substituting for those of Levi and Joseph the respective descendants of the two sons of the latter, Manasseh and Ephraim. For the limits of these tribes see PALESTINE.

In this manner the Hebrews became a settled agricultural people, though often at war with their neighbours the Philistines, the Moabites, the Midianites, the Ammonites, and other tribes. Even the whole land of Canaan was not subdued till a much later period, and the Canaanites remained in strength both in the north and the south, and repeatedly harassed the Hebrew colonists, as we observe in the invasion of Sisera (*Judges*, iv.). On these occasions gallant leaders arose among the Hebrews, styled Sophetim in the Scripture, generally translated Judges, who assumed a sort of dictatorial authority, and rescued the nation from danger; each tribe however retained its internal form of government, and often engaged in petty warfare with its neighbours on its own account. This period of the history of the Jews, which is called the period of the Judges, and which lasted about four centuries, may be considered as the heroic age of the nation, which still retained a primitive simplicity of manner, beautifully portrayed in the tale of Ruth. Samuel was the last of the Judges: he drove away the Philistines who had occupied a great part of the country, but the people growing tired of these frequent invasions, which they had not discipline or union enough among themselves to guard against, wished for a more settled form of government, and demanded of Samuel a king to rule over them. Samuel remonstrated on the dangers of despotism, but the people were determined in favour of the change, and Samuel appointed a youth named Saul, of the tribe of Benjamin, and anointing him, solemnly gave up the authority into his hands. The reign of Saul was long and agitated; he quarrelled with Samuel, and committed various acts of tyranny. Samuel then foretold the downfal of the house of Saul, and he secretly anointed as his successor a youth of the tribe of Judah, called David, who was distinguished for his bravery as well as for the comeliness of his person. Saul having discovered that his successor was already appointed, persecuted David, whose adventures constitute a narrative of romantic interest in the book of *Samuel*. Saul fell in battle against the Philistines, and David succeeded him, about 1056 B.C. The reign of David, which lasted forty years, forms a splendid epoch in Jewish history. He was victorious over all his neighbours. He reduced not only the whole of Canaan, but took possession of the country of Edom as far as the Red Sea, of Moab, of part of Syria, and formed alliances with the kings of Hamath and of Tyre. His power extended from the borders of Damascus to the Elanitic or eastern branch of the Red Sea, and from the coast of the Philistines to near the Euphrates.

David took Jerusalem, which was a town and fort of the Jebusites, a Canaanitish tribe till then unconquered, and made it the capital of the kingdom. He died at an old age, leaving to his son and successor Solomon a flourishing and secure kingdom, a full treasury, and a well disciplined militia. The reign of Solomon was long and peaceful. He raised the famous temple on Mount Moriah, on the east side of Jerusalem, and employed Tyrian and other foreign artificers for the purpose. Solomon was a very wealthy prince: he encouraged commerce, and had ships on the Red Sea manned by Tyrians, which traded with Ophir. His close alliance with the Phœnicians was of great advantage to him; he supplied them with corn, and received timber from Lebanon and other goods in exchange. The Phœnician caravans to Arabia and to Persia passed through his dominions. His own subjects carried on a trade with Egypt, with which country Solomon was on friendly terms, and he married a daughter of one of the Pharaohs. He is said to have built Tadmor or Palmyra, and Baalbek; but his great expenditure, and the taxes by which he supplied his wants, made the people dissatisfied, whilst his own example encouraged them in their licentiousness and effeminacy. He died after forty years' reign, and his son Rehoboam was only able to retain possession of the southern part of the country, comprising the territory of Judah and Benjamin, which then assumed the name of the kingdom of Judah, while the other ten tribes elected Jeroboam as their king, and retained the name of the kingdom of Israel, which had first Sichem, and afterwards Samaria, for its capital. This division took place about 975 B.C. The kingdom of Israel lasted 250 years, through a succession of stormy and blood-stained reigns, and was in the end overthrown by the Assyrians, who carried the inhabitants into captivity, from which they never returned, nor has the existence of their progeny ever been ascertained. The kingdom of Judah lasted above a century and a half longer under the dynasty of the house of David, until Nebuchadnezzar, king of Babylon, after repeated invasions, destroyed Jerusalem, 588 B.C., and carried its inhabitants into captivity. Thus the Jewish monarchy terminated after a period of about five centuries from its first institution, the stirring events of which period are related in the books of *Kings* and *Chronicles*. During this time flourished the prophets Isaiah, Jeremiah, Amos, Hosea, Joel, Micah, Nahum, Ze-

phaniah, Jeremiah, and Habakkuk. Daniel and Ezekiel belong to the period of the Captivity.

The captivity of Judah lasted seventy years, after which Cyrus, having conquered Babylon, allowed the Jews to return to their own country. They assembled for that purpose to the number of 42,360, under Zerubbabel, a descendant of their kings, and on arriving in Judæa were joined by those of the common people and cultivators of the soil who had remained in their native country. They began rebuilding Jerusalem and the Temple, and their neighbours the Samaritans, who inhabited part of the territory of the former kingdom of Israel, offered to join them in the furtherance of the great national work; an offer however which was contemptuously rejected by the Jews, who looked upon the Samaritans as alien colonists, although the Samaritans themselves asserted their descent from the tribes of Ephraim and Manasseh. When the Assyrians led the ten tribes into captivity, they probably took away only the higher class of people, as the Babylonians did with those of Judæa, and did not depopulate the whole country; besides which, during the course of more than two centuries, and particularly after the subversion of the Assyrian empire, many exiles or descendants of exiles may have found their way back to their native land. The fact that the Samaritans have preserved the 'Pentateuch' in the original characters, while the Jews on their return from Babylon adopted the Chaldæan form of letters, is strongly in favour of their Israelitish descent, though they may have been mixed by alliance with Assyrian and other colonists. The Jews however always showed a deadly animosity against the Samaritans, whom they insisted on considering as aliens and idolaters, although they in reality acknowledged the law of Moses.

The character of the Jews themselves had undergone a considerable change during their Babylonish captivity. They had become more exclusively attached to their country and their laws, and we hear no more of their proneness to idolatry after that epoch, as in former times. They strictly avoided intermarriage with foreigners, and assumed in every respect that unsocial spirit towards all except their own community for which they have been so often reproached. Adversity had soured their minds, while the expectations of a Messiah who was announced by their prophets roused the national pride. The doctrine of the immortality of the soul, which is not mentioned in the Mosaic law, was also introduced, especially among the great sect of the Chasadim, or Pharisees.

Under the mild rule of the Persian kings the Jews enjoyed many of the advantages of independence united with security. They were allowed the management of their internal affairs, and the high-priest was their chief magistrate. In this manner they lived quietly and unnoticed, but yet thriving, for about two centuries, till the year 333 B.C., when Alexander, after gaining the battle of Issus, appeared in Syria. Jerusalem made its submission, and was spared by the conqueror. After Alexander's death, Judæa fell under the dominion of the Ptolemies, who showed favour to the Jews, and planted colonies of them in their capital Alexandria, and at Cyrene. The high-priests continued to have the direction of the internal administration of the country. From the Ptolemies Judæa passed under the rule of the kings of Syria, under the reign of Antiochus the Great, 198 B.C. Antiochus visited Jerusalem, and confirmed the privileges which the Jews had enjoyed under the Ptolemies; but under the reign of his second son Antiochus Epiphanes, owing to the intrigues of several aspirants to the high-priesthood, an insurrection broke out in Jerusalem, which was put down by Antiochus with great slaughter of the inhabitants. Antiochus now attempted what no one had attempted before him, to force the Jews to renounce their God and worship Jupiter of Olympus, whose statue was erected on the altar of the Temple. The Jews generally refused. Great cruelties were committed by the officers of Antiochus against the recusants in every part of Judæa, until a spirited resistance begun by Mattathias, and continued under his son Judas, styled Maccabee, had the effect of delivering the country from the hateful oppression of the Syrians. [MACCABEES.] The Maccabees were a family of heroes. After the death of Judas and two of his brothers who fell in battle, Jonathan, another brother, continued the struggle, and having formed an alliance with Rome, was left at last in quiet possession of Judæa. A revolution in the kingdom of Syria added to his strength and importance. Alexander Balas, who claimed the crown of Syria, offered Jonathan the high-priesthood and exemption from all tribute and taxes, besides other advantages, if he would support him against his rival Demetrius. Jonathan assented, and Balas having seated himself on the throne, 150 B.C., presented Jonathan with a purple robe, and appointed him meridarch of Judæa, a title which, under his successors, was changed into that of king. With Jonathan begins the dynasty of the Asmonæans, or 'Illustrious,' which ruled Judæa for about a century, and under which the country resumed a degree of independence and splendour, which it had not experienced since the reigns of David and of Solomon. [ASMONÆANS.]

The last of the Asmonæan dynasty were put to death by Herod son of Antipater the Idumæan, who, with the support of the Romans, became king of Judæa, 38 B.C. [HEROD THE GREAT.] He died in the same year that Christ was born, although in the common chronology the birth of Christ is placed four years later. With Herod the independence of Judæa may be said to have expired. His son Archelaus was appointed ethnarch of Judæa Proper, Idumæa, and Samaria; his brother Herod Antipas had Galilee and Peræa; to Herod Philip were given the provinces of Trachonitis, Batanæa, and Gaulonitis, east of the Jordan, and another Philip had Ituræa. Thus the dominions of Herod were dismembered between four of his sons, who are accordingly styled Tetrarchs in the New Testament. Archelaus was summoned to Rome after a reign of nine years, to answer certain charges brought against him by his subjects, and was banished by Augustus to Vienne in Gaul. Judæa thus became a Roman province, or rather a district dependent on the great province or prefecture of Syria, though administered by a special governor, a man usually of the Equestrian order. This is the state to which Judæa was reduced in the time of our Saviour. The Jews however continued to enjoy the exercise of their religious and municipal liberties.

Under the reign of Claudius, Herod Agrippa, grandson of Herod the Great, who had been already appointed by Caligula ethnarch of Galilee, was appointed king of Judæa and all the former dominions of his grandfather, but he died three years after, at Cæsarea in Palestine, A.D. 44: this is the Herod mentioned in chapter xii. of the *Acts*. His son, called likewise Herod Agrippa, was then a minor, and Judæa relapsed into a Roman province. In A.D. 53 Claudius gave to Agrippa the provinces east of Jordan, which had belonged to Philip the Tetrarch, and Nero added to them part of Galilee. But Judæa and Samaria continued to be administered by Roman procurators. Herod however was entrusted by the emperor with the superintendence of the Temple and the right of appointing and deposing the high-priest at Jerusalem, and he occasionally resided in that city, while the Roman governor generally resided at Cæsarea. This second Herod Agrippa is the one mentioned in *Acts*, xxv., xxvi., there styled King Agrippa, whom St. Paul addressed in so impressive a manner in his defence. Agrippa was present at the final catastrophe of Jerusalem.

A succession of more than usually rapacious Roman governors, Felix, Albinus, and Florus, had driven the Jews to the verge of despair. A tumult, which broke out at Cæsarea between the Greeks and the Jews, followed by fresh exactions and cruelties of Florus, who seemed to wish to drive the people into insurrection, led the way to an open revolt against the Romans. Agrippa, who, with his sister Berenice, happened to be at Jerusalem, remonstrated with the people on the rashness of the attempt, but in vain, and he withdrew to his own dominions. A party called the Zealots, or fanatics, now obtained the ascendency over the minds of the people, and the feeble Roman garrison was overpowered and massacred. At the same time the Greeks of Cæsarea massacred all the Jews in that city, and the Roman governor Florus took no notice of the transaction.

Other cities of Palestine and Syria followed the example of Cæsarea by a wholesale butchery of the Jews. The Jews retaliated in those towns of Palestine where they were the majority by murdering the Syrians and Greeks. Cestius Gallus, the prefect of Syria, who had winked at the exactions of Florus, now advanced against Jerusalem with one legion and many auxiliaries, but he was obliged to retire, and was completely defeated by the insurgents in his retreat, with the loss of nearly 6000 men. The revolt now became universal throughout Judæa and Galilee. Nero, who received the news in Achaia, sent for Vespasian, an officer of tried abilities, and gave him the

command of Syria, A.D. 66-7. Vespasian assembled his forces at Ptolemais, where he was joined by Agrippa and by his own son Titus. His army, including auxiliaries, amounted to 60,000 men. For one year he employed himself in scouring the country and reducing the strongholds of the Jews. In the following year, A.D. 68, he was advancing to form the siege of Jerusalem, when he received the news of Nero's death, followed by the rapid succession of Galba, Otho, and Vitellius. Vespasian kept his troops ready for a more important enterprise than the taking of Jerusalem. That city had in consequence a respite of nearly two years, during which however the inhabitants destroyed each other through intestine factions. At last Vespasian was proclaimed emperor, and having defeated Vitellius and entered Rome, he sent his son Titus to complete the subjugation of Palestine. The regular siege began in the spring of A.D. 70, and it lasted till the following September, when Jerusalem was finally taken and totally destroyed, with its temple: the inhabitants were killed or sold as slaves. The fearful events of that siege are narrated by Josephus. The Arch of Titus at Rome is a standing record of the conquest. The landed property of the country was put up to sale. Still the Jewish population was by no means extirpated from the country, and we find them rising in vast numbers in the reign of Hadrian, and again engaging the Roman legions commanded by Severus. They were however overpowered with immense slaughter, and the second desolation of Judæa took place. [BARCOCHEBA; HADRIAN.]

Hadrian issued an edict forbidding circumcision, the reading of the Mosaic law, and the observance of the Sabbath.

The dispersion of the Jews over the world, which is commonly dated from the destruction of Jerusalem, had in reality begun long before. The Ptolemies had transplanted large colonies of them into Egypt, Cyrene, and Cyprus; and Antiochus the Great settled great numbers in the towns of Asia. In the time of Cicero (*Pro Flacco*) there was a wealthy Jewish community in Italy. A passage of Philo, in his letter of Agrippa, enumerates the countries in which the Jews were settled in the time of Caligula: Egypt, Syria, Pamphylia, Cilicia, the greatest part of Asia Minor as far as Bithynia, the shores of the Euxine, Macedonia, Thessaly, Ætolia, Attica, the Peloponnesus, Cyprus, and Crete, besides the countries beyond the Euphrates; for at the end of the Babylonish captivity many Jews voluntarily remained in Mesopotamia, where they continued to form for several centuries a considerable community, alternately under the Parthian and Roman dominion. After the final destruction of Jerusalem, the Mesopotamian Jews acknowledged an hereditary chief, who was called 'the prince of captivity,' while the western Jews, who were scattered all over the Roman empire, had their spiritual head in the patriarch of Tiberias. The civil condition of the Jews throughout the Roman empire has been not unaptly compared with that of the Greeks under the Turks.

Under the Antonines and other succeeding emperors the harsh provisions of the edict of Hadrian were either revoked or allowed to lie dormant, and the Jews were left to follow their old usages and rites, being only prohibited from making proselytes. New synagogues were erected by them, and schools opened in the principal cities of the empire. The Jews by means of their commercial industry acquired considerable wealth, many of them obtained the rank of Roman citizens, and at the same time exemption from military service. During this period of peace, Rabbi Jehuda, one of the patriarchs of Tiberias, composed the 'Mischna,' or code of traditional law, in which he embodied all the authorized interpretations of the Mosaic law, the traditions, the decisions of the learned, and the precedents of the courts or schools. At a later period Rabbi Ascha, a learned Mesopotamian Jew, with the assistance of his disciples, compiled the 'Gemara,' which, with the 'Mischna,' forms the 'Babylonian Talmud,' a work in which the most absurd traditions are mixed up with wise precepts, profound allegories, and pleasing moral apologues.

Constantine made several laws concerning the Jews, one forbidding them to endanger the lives of Christian converts, another prohibiting Christians from embracing Judaism, and a third prohibiting Jews from possessing Christian slaves. Under his successor Constantius an insurrection which broke out in Judæa, and another tumult at Alexandria, in which the Jews were deeply implicated, gave occasion to fresh enactments against them: they were heavily taxed, were forbidden to marry Christian women, and the edict of Hadrian, which prohibited their approaching near to Jerusalem, was formally renewed.

Julian favoured the Jews and proposed to restore their temple. Some extraordinary appearances which are related by Ammianus Marcellinus frightened the workmen who were employed in the restoration, and the death of Julian put an end to the design. Under the following emperors the Jews were protected by the state, though often annoyed by the intemperate zeal of the more violent Christian churchmen. Laws were passed by Theodosius, and confirmed by Arcadius and Honorius, recognising the power of the Jewish patriarch to punish the refractory members of their own community, and the prefects were forbidden from interfering with his judicial authority. In disputes with Christians both parties appeared before the ordinary tribunals. Under Theodosius II. the Jews were forbidden from publicly celebrating certain festivals which occasioned collisions between them and the Christians.

Theodoric and the other Gothic kings of Italy protected the Jews. During the frequent wars and invasions of that period the Jews had the slave-trade of Europe in great measure in their hands; and several councils and Pope Gregory I. interfered to prevent their abusing the power which they had thus acquired over the persons of Christians. That wise and humane pope, in his pastoral letters, bewails and denounces this traffic, which was carried on in Italy, Sicily, Sardinia, and France; he directs the bishops to interfere so as to prevent Jews from retaining Christian slaves when a proper price was offered for them. On another occasion he directs that those Christian slaves who had been long in possession of Jewish landed proprietors should be considered as villains attached to the soil, and should not be transplanted or sold away; he also entreated the Frankish kings to banish the traffic in slaves from their dominions.

Justinian was one of the first who enacted really oppressive and intolerant laws against the Jews. In litigations between Christians and Jews, or between Christians only, the testimony of a Jew or Samaritan was to be rejected; in the litigations of Jews among each other, the Jew's testimony was admitted, but that of a Samaritan or a Manichæan was of no value. By another law, all unbelievers, heathens, Jews, and Samaritans could neither be judges, nor prefects, nor fill any other dignity in the state. Justinian also enacted that in mixed marriages between Jews and Christians the chief authority over the children should rest with the Christian parent. A Jew parent could not disinherit his Christian child. But the Samaritans were treated more harshly: they were entirely deprived of the right of bequeathing or conveying their property to unbelievers. Those of their children who embraced Christianity inherited to the exclusion of the rest. Samaritans could not sue in courts of law. Their synagogues were ordered to be destroyed. By a subsequent edict, and on the humane interposition of Sergius, bishop of Cæsarea, Justinian somewhat mitigated the rigour of these enactments against the Samaritans, but his son Justin again enforced the original statutes against them. The effect of this persecution seems to have been to extinguish gradually that once flourishing community, the members of which probably embraced Christianity for the preservation of their property. In subsequent history the Samaritans no longer appear as a separate people. In the seventeenth century however a small community of them was discovered in the neighbourhood of their holy Mount Gerizim, who still possessed the law in the old Samaritan character, and their descendants exist to this day.

The Jews however were too numerous and strong to be annihilated, like the Samaritans, by imperial edicts: they had even the power of revenge. When Chosroes II. invaded Syria, the Jews of Palestine rose to join the Persians, with whom they entered Jerusalem, then a Christian city, and perpetrated a dreadful slaughter of the Christian inhabitants. They are said to have purchased at a cheap price the captives of their allies the Persians, for the sake of murdering them. The victories of Heraclius however soon put an end to their momentary triumph.

The rise of Mohammedanism brought an unfavourable change to the Eastern Jews; Mohammed endeavoured at first to win them over, but the Jews would not ac-

knowledge a descendant of Hagar the bondwoman as the greatest of prophets, and Mohammed treated them without mercy in Arabia, where they were at that time numerous. But under the Caliphs his successors they were protected on the easy terms of paying tribute, and as they made no resistance, they experienced not only protection but even encouragement from their new masters, whom they followed through their tide of conquest along the coast of Northern Africa. They also contributed materially to the triumph of the Crescent in the Spanish Peninsula.

In Spain, under the Gothic kings, the Jews had experienced the first of those sweeping proscriptions, which they were doomed to suffer in every country of Christian Europe. A series of oppressive laws was passed against them under the significant title of 'Statutes against Jewish Wickedness, and for the General Extirpation of Jewish Errors.' At last King Sisebut commanded them either to forsake their religion or to leave the country. Many fled, others were thrown into prison, and 90,000 are said to have received baptism. The fourth council of Toledo mitigated the rigour of the laws against the Jews by declaring 'that men ought not to be compelled to believe by force, although all who had once embraced the faith must be constrained to adhere to it.' But the eighth council of Toledo, A.D. 653, reinforced the former statutes against the Jews, and following councils enacted more rigorous laws. One hundred lashes on the naked body, chains, mutilation, banishment, and confiscation, were the punishment of those who observed Jewish practices and rites. All converted Jews were put under the strictest surveillance. The acts of the twelfth council of Toledo concerning the Jews are a complete model of ecclesiastical intolerance and refinement in persecution. Under King Egica, while the Saracens were spreading along the shore of Africa opposite to Spain, a general conspiracy of the Jews was reported, and another council passed a decree to disperse the whole race as slaves, confiscate their property, and seize all their children under seventeen years of age, to be brought up as Christians. Many escaped to return with the Saracen invaders, and the munificence of the Mohammedan princes towards them indicates that by their knowledge of the country the Jews had been highly instrumental in advancing the conquest. In Moorish Spain the Jews had really a golden age, which lasted for centuries. There they cultivated science and learning; and the names of Benjamin of Tudela, Isaac of Cordova, Hasdai, the confidant of Abderrahman, and a host of others, attest their proficiency. Rodriguez de Castro (*Bibliotheca Española*) and Vicente Ximeno (*Escritores del Reyno de Valencia*) give notices of the writings of the Spanish Jews. At the same time they were thriving in the East under the caliphs of Bagdad, whose favour they enjoyed, at least till towards the end of the tenth century.

Charlemagne protected the Jews like his other subjects: they filled municipal offices; they were physicians and bankers; and Isaac, a Jew, was chosen by that emperor as his ambassador to Harun al Rashid, caliph of Bagdad, a mission which was considered of the greatest importance at the time. The Jews enjoyed the same or even greater influence under Louis le Debonnaire and Charles the Bald, but towards the end of the latter reign the clergy began afresh to show their hostility. The Council of Meaux re-enacted the exclusion of the Jews from all civil offices; but it was under the third or Capet dynasty that the Jews suffered real persecution in France. Philippe Auguste, pressed by the wants of an empty exchequer, and perhaps also by the reports of fanatics, who charged the Jews with all sorts of crimes, banished, A.D. 1180, all the Jews from his dominions, confiscated their property, and declared all debts due to them to be annulled. About twenty years afterwards the Jews were allowed to re-enter France, which they did in great numbers. This was the beginning of a series of alternate proscriptions and relaxations, continued under the following reigns for about two centuries, until they were finally expelled under Charles VI.

In Germany about the same age they suffered under sudden bursts of popular fanaticism. They were massacred at the cry of 'Hep,' 'Hep,' the initials of the words 'Hierosolyma est perdita.' St. Bernard and Pope Eugenius III. loudly reprobated these atrocities. In Italy the Jews seem to have enjoyed greater, though not always uninterrupted security, but their safest asylum was Poland, where Casimir the Great allowed them considerable privileges, and where they formed the only middle order between the nobles and the serfs. It was in Spain and Portugal, after the expulsion of the Moors, that the proscription of the Jews was most sweeping and effectual. The regular Inquisition established under Ferdinand and Isabella undertook the task of punishing all relapsed converts. As for the unconverted Jews, the edict of 1492, made at the instigation of the Inquisitor Torquemada, banished them all from the kingdom. The number of Jews thus expelled from Spain has been vaguely estimated at half a million, and even 800,000. They were allowed to carry away or sell only their moveables. Few of them consented to embrace Christianity in order to remain. Soon afterwards they were driven away from Portugal also with circumstances of still greater barbarity. Many perished, and others took refuge on the African coast. The expulsion of the Jews and that of the Moors or Moriscoes drained Spain of its most useful subjects.

Throughout the dominions of the Sultan the Jews were allowed to settle and follow their trades, though looked upon with scorn by the Osmanlees. In the regencies of Barbary they settled likewise in great numbers.

During the eighteenth century a milder spirit of toleration manifested itself towards the Jews in several countries of Europe. Maria Theresa and Joseph I. gave them equal rights and subjected them to the same laws with the Christians. Frederic, called the Great, was not so liberal towards them, for he laid them under peculiar restrictions and disqualifications. In Holland they have long formed a highly flourishing, numerous, honourable, and intelligent community.

Napoleon in 1806 assembled a sanhedrim at Paris, and submitted to them twelve questions concerning the moral and social doctrines and discipline of the Jews. Their answers being found satisfactory, an ordinance was issued giving the Jews a regular organization throughout France, and placing them on the same footing as other Frenchmen. This system has remained unaltered. The king of Prussia and other German powers have followed the example. In Russia the Jews are subject to many restrictions, and especially the Rabbins.

The Jews in France are reckoned at 50,000; in Italy about 36,000; in the Austrian empire 520,000; in Prussia 135,000, in the rest of Germany 138,000; in Holland and and Belgium 80,000; in Great Britain 30,000; in Russia and Poland 658,000; in the Turkish dominions they have been vaguely estimated at 800,000; in Persia they are few and oppressed. There are communities of them at Bokhara and other parts of Tartary, in India, and even in China. In the United States they are reckoned at about 5000.

(Jost, *Allgemeine Geschichte des Israelitischen Volkes*; Millman, *History of the Jews*; Josephus; Basnage; Beer, *Geschichte aller Bestandenen und noch Bestehenden Religiösen Sekten der Juden*; Beugnot, *Les Juifs d'Occident.* Lindo's *Jewish Calendar* contains a Chronological Table, in which some of the dates differ from some of those given in this article.)

It does not appear at what time the Jews found their way to this island, but they were settled here in the Saxon period, and as early as A.D. 750. From the time of the Conquest the Jews in England rapidly increased in number. Under the first three Norman kings they lived undisturbed, so far as we are informed, and apparently acquired great wealth. But under Stephen and his successors they suffered grievously from the rapacity of the kings and the bigoted intolerance of the people. The cruel persecutions which they experienced from all persons, both lay and ecclesiastic, poor and rich, are fully attested, not by their own writers, but by the evidence of their enemies. Finally, in the reign of Edward I., about A.D. 1290, all the Jews were banished from the kingdom. Their numbers at that time are conjectured (but on what grounds we are not aware) to have been between 15,000 and 16,000. It was not till after the Restoration, A.D. 1660, that the Jews again settled in England; and though under the Protectorate they had entered into negotiations with Cromwell to obtain permission to enter the island, nothing seems to have been done in the matter, and those who have investigated the subject bring forward no proof of leave being formally granted to them to return. After the Restoration it seems probable that they came in gradually without either permission or opposition, and since that time foreign Jews have been on the same footing as other aliens with respect to entering the country. In the year 1753 an act was passed to enable foreign Jews to be naturalized without

taking the sacrament; but the act was repealed in the following session, under the influence of the popular feeling, which was most strongly opposed to the measure of 1753. Since this year no legislative act has passed with special reference to the Jews, and they have lived in the United Kingdom unmolested. It is said that the number of Jews in London alone is about 18,000, and in the rest of England about 9000. The number in Scotland and Ireland is probably small, but we are not aware that there is any good estimate as to their numbers in these parts of the United Kingdom.

During their residence in England, up to their banishment in the time of Edward I., the Jews were considered as the villains and bondsmen of the king, a relation which seems to explain the power over their persons and property which was assumed and exercised by the king in the most oppressive manner. They however could purchase and hold land, subject only to the right of the king, whatever it might be, to levy heavy taxes on them and seize their lands if they were not paid. By the act of the 55th of Henry III. the Jews were declared incapable of purchasing or taking a freehold interest in land, but might hold, as in time past they were accustomed to hold, houses in the cities, boroughs, and towns where they resided. Another act, 3 Edward I., forbade Jews from alienating in fee, either to Jew or Christian, any houses, rents, or tenements which they then had, or disposing of them in any way without the king's consent; they were permitted to purchase houses and curtilages in the cities and boroughs where they then resided, provided they held them in chief of the king; and they were further permitted to take lands to farm for any term not exceeding ten years; such permission however was not to continue in force for more than fifteen years from the date of the act. Since the time of their banishment no statute has been passed which in direct terms affects the right of the Jews to hold real estates in England; and it has been a matter of dispute whether they can now legally hold such estate. It has been contended that the act called the 55th Henry III. is not an act of parliament, but only an ordinance of the king, which however, to say the least, seems a very questionable proposition. Some Jews, we believe, do hold real estate, and it is contended by some that they are legally entitled to do so. It is out of the place here to discuss this question, and the reader is referred to the authorities at the end of the article.

The Jews are still incapacitated from being members of parliament and filling various offices in this country. The act of the 9th Geo. IV., c. 17, substitutes for the sacramental test a form of declaration to be made by every person, within one calendar month next before or upon his admission into any of the corporate offices mentioned in that act, or within six calendar months after his appointment to any place mentioned in the fifth section of that act. As this declaration contains the words 'upon the true faith of a Christian,' it has the effect of excluding Jews from corporate offices, and, in connection with the Abjuration Act, from places under government, so far as they are not relieved by the Annual Indemnity Act. The abjuration oath, which contains the same words, has the effect of excluding the Jews from parliament. (1 Geo. I., st. ii., c. 13; 6 Geo. III., c. 53.) Several attempts have been made, but hitherto unsuccessfully, to remove these impediments to the Jews being on the same footing as other British subjects.

It seems to be the general opinion that the Jews are within the benefit of the Toleration Act of the 1 William and Mary, as extended by the 53 George III., c. 160. The following disability is a singular one. It has been decided that a legacy given for the instruction of Jews in their religion is not one which will be supported by the Court of Chancery, though any other kind of charitable bequest for the benefit of Jews is valid. It is a vulgar error, still entertained by some people, that Jews, even if born in this country, are aliens. Perhaps it is hardly necessary to remark that they are British subjects, like any other persons who are born here.

(Blunt's *History of the Establishment and Residence of the Jews in England, with an Enquiry into their Civil Disabilities*, London, 1830; Goldsmid's *Remarks on the Civil Disabilities of British Jews*, London, 1830.)

JIDDA. [ARABIA.]

JIG, or GIGUE, an animated quick dance-tune, in six-eight time, to be found in the sonatas of Corelli, Handel, and other composers, till towards the middle of the eighteenth century. The *jig*, or at least the name, is unknown in modern music; though in a French work, of quite recent date, we are told that it is still in use in England.

JOAN, POPE, a supposed individual of the female sex, who is placed by several chroniclers in the series of popes between Leo IV. and Benedict III. about A.D. 853-5. The first who mentions the story is Marianus Scotus, a monk of the abbey of Fulda, who died at Mainz, A.D. 1086, and who says in his chronicle, under the year 853, the 13th year of the reign of the emperor Lotharius, that Leo IV. died on the 1st of August, and that to him succeeded Joan, a woman, whose pontificate lasted two years, five months, and four days, after which Benedict III. was made pope. But Anastasius, who lived at the time of the supposed Pope Joan, and who wrote the lives of the popes down to Nicholas I. who succeeded Benedict III., says, that fifteen days after Leo IV.'s death Benedict III. succeeded him. It is true that some manuscript copies of Anastasius, among others one in the king's library at Paris, contain the story of Joan, but this has been ascertained to be an interpolation of later copyists, who have inserted the tale in the very words of Martinus Polonus, a Cistercian monk and confessor to Gregory X., who wrote the lives of the popes, in which, after Leo IV., he places 'John an Englishman,' and then adds, '*Hic, ut asseritur*, fœmina fuit:' he then goes on to say that this Joan when a young woman left her home in man's disguise, with her lover, a very learned man, and went to Athens, where she made great progress in profane law; afterwards she went to Rome, where she became equally proficient in sacred learning, for which her reputation became so great that at the death of Leo she was unanimously elected as his successor, under the general belief of her male sex. She however became pregnant, and one day as she was proceeding to the Lateran Basilica, she was seized in child-labour on the road between the Colosseum and the Church of St. Clement, and there she died and was buried without any honours, after a pontificate of two years, five months, and four days. The story was generally copied from Martinus by subsequent writers, and Platina himself, in his 'Lives of the Popes,' repeats it on the authority of Martinus, adding various other reports concerning the 'sella stercoraria,' &c., and concluding with these words: 'The things I have above stated are current in vulgar report, but are taken from uncertain and obscure authorities, and I have inserted them briefly and simply, not to be taxed with obstinacy.' Panvinius, Platina's continuator, subjoins a very critical note, in which he shows the absurdity of the tale, and proves it to have been an invention. But the best dissertation on the subject is that of David Blondel, a Protestant, who completely refutes the story in his *Familier Eclaircissement de la question si une Femme a été assise au Siège Papal entre Leon IV. et Benoit III.*, Amsterdam, 1649. There are critics who contend that it is only the later MSS. of the 'Lives of the Popes' by Martinus Polonus which contain the tale of Pope Joan, and that those MSS. which were written during the life or soon after the death of Martinus do not contain it. It is evident however that the story was in circulation already in the 12th century, long before the time of Martinus, as Etienne de Bourbon de Belleville, a companion of St. Dominic, in his treatise 'De Septem Donis Spiritus Sancti,' under the head of 'Prudentia,' relates from 'the Chronicles' the story of Pope Joan, but places it about the year 1100, and says that on the discovery of her sex she was stoned to death by the people. These authorities prove at all events that the Protestants did not invent the tale of Pope Joan, as they have been accused of having done.

JOAN I. of Naples, daughter of King Robert of Naples, of the Anjou dynasty, succeeded her father in 1343. She was then only sixteen years of age, handsome, and accomplished. She had been married already some time to her cousin Andreas of Hungary, but their tempers and tastes did not sympathise together. Andreas claimed to be crowned king and to share his wife's authority, which, by the will of her father, had been left solely to her. His coarse and haughty manners offended the proud native barons, and the Hungarian guards which attended him excited their jealousy. A conspiracy was formed, and one night, while the court was at Aversa, the conspirators, who were of the nobles near his person, seized and strangled him, and threw his body out of a window of the castle. There seems little or no doubt that Joan knew of the plot, and that she did nothing to prevent the crime. As soon as it was per-

petrated she repaired to Naples, and thence issued orders for the apprehension of the murderers. Torture was employed to find out the conspirators, but the result of the interrogatories was kept secret. Many persons, high and low, were put to a cruel death, but public opinion still implicated the queen herself in the conspiracy. The same year Joan married her relative Louis, prince of Tarentum. Louis, king of Hungary, and brother of Andreas, came with an army to avenge his brother's death. He defeated the queen's troops, entered Naples, and Joan took refuge in her hereditary principality of Provence. She repaired to Avignon, and there, before Pope Clement VI., she protested her innocence and demanded a trial. The pope and his cardinals acquitted Joan, who, from gratitude, gave up to the papal see the town and county of Avignon. A pestilence in the mean time had frightened away the Hungarians from Naples, and Joan, returning to her kingdom, was solemnly crowned with her husband in 1351. Joan reigned many years in peace over her fine dominions. Having lost her second husband in 1362, she married a prince of Majorca, and on his death she married, in 1376, Otho, duke of Brunswick; but having no children by any of her husbands, she gave her niece Margaret in marriage to Charles, duke of Durazzo, who was himself related to the royal dynasty of Anjou, and appointed him her successor. Soon afterwards the schism between Urban VI. and Clement VII. broke out, and Joan took the part of the latter. Urban excommunicated her, and gave the investiture of the kingdom to Charles Durazzo, who, with the darkest ingratitude, revolted against his sovereign and benefactress; with the assistance of the pope he raised troops, defeated the queen, and took her prisoner. He tried to induce Joan to abdicate in his favour, but the queen firmly refused, and named as her successor Louis of Anjou, brother of Charles V., king of France. Charles then transferred Joan to the castle of Muro, in Basilicata, where he caused her to be strangled or smothered in her prison, in 1382, thirty-seven years after the death of her first husband Andreas.

JOAN II., daughter of Charles Durazzo, and sister of Ladislaus, king of Naples, succeeded the latter after his death in 1414. She was then forty-four years of age, and already noted for licentiousness and weakness of character. After her exaltation to the throne she continued in the same course, only with more barefaced effrontery. She however married, from political motives, James, count de la Marche, who was allied to the royal family of France; but the match, as might be expected, proved most unhappy. James was obliged to run away in despair from Naples, and retired to France, where it is said that he ended his days in a convent. Meantime unworthy favourites ruled in succession at the court of Joan. One of them, Ser Gianni Caracciolo, of a noble family, saw his influence disputed by the famous condottiere Sforza Attendolo, who, together with many barons that were jealous of Caracciolo, took the part of Louis of Anjou, a grandson of that Louis to whom Joan I. had bequeathed the crown. The queen sought for support in Alfonso of Aragon, king of Sicily, whom she adopted, and appointed her successor. Alfonso came to Naples, but the fickle Joan having made her peace with Sforza, revoked her adoption of Alfonso, and appointed Louis of Anjou as her successor. Alfonso was accordingly obliged to return to Sicily. The favorite Caracciolo was soon after murdered in consequence of court jealousy and intrigue. Louis of Anjou died also, and was followed to the grave by Joan herself, who, on her death, appointed René of Anjou as her successor. She died in 1435, leaving her kingdom in great disorder, and with the prospect of a disputed succession and a civil war. [ALFONSO V. of Aragon.]

JOAN OF ARC. [ARC, JOAN OF.]

JOA'NNINA, or YA'NINA, a city of Albania, situated in a valley in the heart of that province, on the south-western bank of a lake, from which a subterraneous stream flows into the Kalamá, the Thyamis (Θύαμις) of the antient Greeks. Joannina is in 39° 47′ N. lat., 20° 53′ E. long., according to the map prefixed to Colonel Leake's 'Travels in Northern Greece' (London, 1835). Its site is about 1000 feet above the level of the sea.

The origin and early history of this town are very obscure. In the later period of the Lower or Byzantine Empire it gradually became the chief city of that part of Greece which lay to the west of Mount Pindus. It is probably not very far from the site of the antient Dodona. In the seventh and following centuries, to the eleventh, the country around became a field of contention between the Byzantine Greeks and the Wallachians and Sclavonians, large colonies of whom settled in the district; but Joannina seems to have continued in the hands of the Greeks till the year 1082, when it was taken by the Normans under Bohemond (son of Robert Guiscard), who defeated the emperor Alexius Comnenus under the walls of the town. In the wars which subsequently desolated Western Greece it passed into the hands of the Frankish princes of the Ionian Islands, and in A.D. 1431 or 1432 into those of the Turks. In A.D. 1611 an unsuccessful attempt of the Albanian Greeks to throw off the Turkish yoke occasioned the expulsion of all Greeks from the old town, now termed the Castron (Κάστρον), or fortified part of Joannina. This led to the extension of the city along the banks of the lake on each side of the Castron, and subsequent tranquillity tended so far to its increase, that under the sway of the late Ali Pasha it contained a population of more than 40,000 inhabitants, chiefly Greeks, the remainder Moslems and Jews. It had two citadels (the Castron and the fortress of Litaritza), three palaces, nineteen mosques, five tekés, or Turkish monasteries, six Greek churches, one of them metropolitan, and two Jews' synagogues. There were an hospital, capable of receiving 150 patients, a prison, and two endowed colleges or schools, one of 300 scholars and one of 100, at which the antient languages were taught, and to which excellent libraries were attached. There were several smaller schools. The Greek spoken at Joannina was purer than in Greece Proper. The town was commercial rather than manufacturing: the chief commerce was carried on with Constantinople, Russia, Venice and Malta, and with the smaller towns and villages of Epirus, of which Joannina was the mart. The place was well supplied with turkeys and fowls, turtle-doves and beccaficos; fish and wild-fowl from the lake, and game from the neighbouring mountains. Little animal food was consumed, and ducks and geese were scarce. The climate is variable, and fevers, especially nervous, are common. The plain round Joannina yields fruit and grain of most kinds in vast abundance.

The lake of Joannina is in its greatest length twelve or fourteen miles measured from north-west to south-east; the greatest breadth is about five miles, the least about half a mile to a mile. It is bounded on the north-east by the Mitzikéli mountains (a branch of Pindus), which rise with very steep ascent to the height of 2500 feet above the lake; on the south-east by a rocky mountain of moderate height crowned with the extensive ruins of an antient Epirote city, which Colonel Leake considers it probable was the antient Dodona. On the south-west side of the lake is the plain of Joannina, and beyond that a range of low vine-covered hills. Opposite the town of Joannina is a small island on which is a fishing village, containing, in Ali's time, about two hundred houses: on this island were several convents, frequently used as state prisons; Ali, who had a house on it, kept a herd of red deer. The lake abounds with fish, among them are pike, perch, carp, tench and eels: some of them are of great size, sometimes weighing 24 or 25 lbs. avoirdupois; the eels are very fine, and sometimes of six or seven lbs. weight. Myriads of wild-fowl breed in the covert of the lofty reeds which surround the lake.

The lake is very commonly represented as divided into two parts, the north-western part being called the Lake of Lapsista, the south-eastern that of Joannina. But the middle part is rather a marsh than a lake, and is traversed by two long channels which connect the two portions of the lake. The Lake of Lapsista is much reduced in its dimensions in summer, and maize is grown on the desiccated ground. The waters of both lakes are absorbed by subterranean channels; that which communicates with the river Kalamá is in the Lake of Lapsista.

JOB, the Book of, is one of the poetical books of the Old Testament. Its title is taken from the patriarch Job ([illegible]) whose story it relates. Some critics have supposed, from the nature of the exordium, that Job was not a real person, and that the narrative in the book is fictitious. He appears however to be referred to as a real person by *Ezekiel* (ch. xiv., ver. 16), and *James* (ch. v., ver. 11); and the style of the book has all the circumstantiality of a real narrative. It has been inferred from his longevity (chap. xlii., 16), his holding the office of priest in his own family (chap. i., 5), his allusion to no other species of idolatry than the worship of the heavenly bodies (chap. xxxi. 26-28), the silence of the book respecting the history of the Israel-

tes and the Mosaic laws, and several incidental allusions to patriarchal customs, that Job lived in the patriarchal age. Dr. Hales has attempted, by astronomical calculations, to fix the exact time of Job's trial at 184 years before the birth of Abraham. (Hales's *Chronology*, vol. ii., pp. 55-7, 2nd edit.) There is a genealogy of Job at the end of the Septuagint version of this book, which makes him the fifth in descent from Abraham. Some critics have discovered what they consider proofs of a much later date in the book itself.

The scene of the poem is laid in the 'land of Uz' (עוץ), which, as Bishop Lowth has shown, is probably Idumæa.

The language is Hebrew, with a considerable admixture of Arabic, or, as others contend, of Aramaic.

The author is unknown. The arguments already stated with respect to the age at which Job lived are considered by most critics to prove the very high antiquity of the book. Lightfoot and others have supposed that Elihu was the author. This idea is founded chiefly on a translation of ch. xxxii., 16-17, the correctness of which is very doubtful. A very general opinion among critics ascribes it to Moses. Dr. Mason Good has concluded, from the character of the book, that the writer must have possessed certain qualifications of style, knowledge, country, and age, which are to be found in Moses alone. The same writer has collected a number of passages in which he sees a resemblance to the sentiments and style of Moses (Good's *Book of Job, Prelim. Disc.*, p. lvii., &c.) On the other hand Bishop Lowth remarks, that the style of Job differs widely from the poetical style of Moses, being much more concise, and more accurate in the poetical conformation of sentences. Several critics, among whom is Eichhorn, assign to the book a date earlier than the time of Moses. Schultens, Lowth, and others suppose Job himself, or some contemporary, to have been the author, and that the book fell into the hands of Moses while he lived in Idumæa, and was used by him to teach the Israelites patience and submission to the will of God, either during their bondage in Egypt, or in their subsequent wanderings. It is alleged that this hypothesis solves all the difficulties arising out of the internal character of the book, and accounts for its admission into the canon of the Hebrew Scriptures. Other critics assign a much later date to the book; several have ascribed it to Solomon, chiefly on the ground of a resemblance between certain passages in it and in the 'Proverbs.' Umbreit places it at the time of the Babylonish captivity (Umbreit's *Version of the Book of Job*, in the *Biblical Cabinet*, Introduction).

The canonical authority of the Book of Job is fully established by frequent quotations from it, both in the Old and New Testament. Several examples are pointed out in the notes to Good's version.

The design of this book appears to be to teach patience under suffering from the doctrine of a Divine Providence governing all things. It consists of a controversy between Job and three friends who came to visit him in his distress, on the question whether men enjoy prosperity or suffer adversity in this life according as their actions are good or wicked. At ch. xxxii. a new disputant is introduced in the person of Elihu, who reproves both parties for the sentiments they had expressed; and at length the dispute is decided by the interposition of God himself. The integrity of Job, which his friends had called in question on account of his calamities, is vindicated; and he is restored to possessions twice as great as he had before his trial. (Compare *James*, v., 10, 11.)

(The *Introductions* of Eichhorn, Jahn, De Wette, and Horne; Dr. Mason Good's *Translation of the Book of Job*; Lowth's *Lectures on the Sacred Poetry of the Hebrews*, lectures xxxii., xxxiii. For a list of Commentators see Watt's *Bibliotheca Britannica*.)

JOEL (יואל, Ἰωήλ), one of the twelve minor Hebrew prophets. In the first verse of the first chapter of his prophecy we are told that he was the son of Pethuel. Beyond this we have no certain information respecting him. The pseudo-Epiphanius states that he was born at Beth-horon, on the confines of Judah and Benjamin. He prophesied in the kingdom of Judah, but in what reign is uncertain. The most probable opinion is that which places his prophecy in the reign of Uzziah, contemporary with Amos and Hosea, between 800 and 780 B.C. He appears to refer to the same events as Amos (compare *Joel*, ch. i. with *Amos*, ch. iv., 6-9, and *Joel*, ii., 4-6 with *Amos*, i., 9, 10); and he does not mention the Assyrians or the Babylonians among the enemies of Judah, but only Egypt and Edom (ch. iii., 19). Other opinions have referred him to the reign of Joram (B.C. 895—883), and to that of Manasseh (B.C. 697—642).

The prophecy of Joel may be divided into two parts. In the first he describes a famine caused by the ravages of insects, and exhorts the people to repentance; denouncing still greater judgments if they continue impenitent, and promising the return of prosperity and plenty if they attend to his warning. The second part, beginning at ch. ii., ver. 28, alludes to events much more remote. The prophetic passage in ch. ii., ver. 28-32, is quoted by the apostle Peter as accomplished by the miraculous gift of tongues on the day of Pentecost (*Acts*, ii. 17-21). The remainder of the prophecy is supposed to be at present unfulfilled.

The canonical authority of this book has never been disputed. It is established by other quotations in addition to the remarkable one just mentioned.

Bishop Lowth (*Prælect.*, xxi.) remarks on the style of Joel: 'He is elegant, perspicuous, copious, and fluent; he is also sublime, animated, and energetic. In the first and second chapters he displays the full force of the prophetic poetry, and shows how naturally it inclines to the use of metaphors, allegories, and comparisons. But while we allow this just commendation to his perspicuity both in language and arrangement, we must not deny that there is sometimes great obscurity observable in his subject, and particularly in the latter part of the prophecy.'

(Rosenmüller's *Scholia*; Horne's *Introduction*; and list of commentators in Watt's *Bibliotheca Britannica*.)

JOHANNA. [ANZUAN.]

JOHANNISBERG. [NASSAU.]

JOHN, SAINT, THE BAPTIST, son of Zachariah, a Jewish priest, and Elizabeth his wife, who was a near relation of Mary the mother of Jesus Christ, was born to them in their old age. The sacred office was assigned to him of being the precursor or herald of the Messiah. The history of the public ministry of Jesus begins with the acts of John the Baptist, whom we find withdrawing himself from the ordinary affairs of life and retiring to the desert country watered by the Jordan, where he preached in a fearless manner against the vices of the age, urged an immediate repentance, enforcing his exhortations by the announcement that the Kingdom of Heaven was at hand, and requiring of those who professed to receive him as their instructor that they should submit to the rite of baptism.

Amongst those who came to him and were baptized by him was Jesus Christ, who at his baptism was announced, both by the Baptist himself and by a voice from heaven, to be the Son of God, the Messiah.

From this time we hear little more of John till we find him in prison. He had ventured publicly to reprove Herod the king for an act of great immorality. Herod had married Herodias who was the wife of Philip, tetrarch of Idumæa, his own brother. The Baptist's reproof was resented more violently by Herodias than by Herod. The history is related by the Evangelists with all particulars. Salome, the daughter of Herodias, had so pleased Herod with her dancing at a public entertainment given by him, that he in an Oriental affluence of professed obligation said publicly, that he [illegible] give her whatever she would ask, even to the half of his [illegible] The little girl, for she was then extremely young, instruct[illegible] wicked mother, asked the head of John the Baptist. [illegible] immediately sent to the prison in which John was con[illegible] beheaded him, and delivered the head to the young princess, [illegible] it in a dish to her mother.

JOHN, SAINT, THE APOSTLE AND EVAN[illegible]LIST. Among the persons who at the commencement of his ministry joined themselves to our Saviour were two brothers, named James and John, the sons of Zebedee. They were both admitted by him into the number of his Twelve Apostles, and John was throughout distinguished by him with peculiar marks of regard. He speaks of himself, in the account which he left of the ministry of Jesus, as the disciple whom Jesus loved: and whenever a very few only of the apostles were to be employed by Jesus, or to accompany him, John was always one of the number, James and Peter being usually the others.

At the Last Supper we find him leaning on the bosom of Jesus. He attended Jesus in the garden and in the hall of the high-priest. He accompanied him to Calvary, and when Jesus was hanging on the cross John drew near, and

while the miraculous darkness struck fear into the hearts of those who were employed in the work of death, he entered into conversation with Jesus, who commended to him the care of his mother Mary. This dying request of our Lord the apostle seems to have regarded as a sacred injunction, for he took her from that time to his own house.

After the resurrection of Jesus he was again distinguished by his notice; and when Jesus had ascended to heaven, and the interests of the Gospel were committed especially to those who had been chosen by him out of the world, John became one of the leading persons in the church; acting in concert with the other apostles, and especially Peter and James, till the history in the 'Acts of the Apostles' ceases to notice what was done by the other apostles, and is confined to the travels and labours of Saint Paul.

Saint John's labours in the church were chiefly among the inhabitants of Syria and Asia Minor, and no doubt he had a large share in planting Christianity in those provinces, where for a time it flourished greatly. But Christian antiquity does not present to us many particulars of the labours of the apostles, and we learn from it respecting John little more on which dependence may be safely placed, than that he resided at Ephesus in the latter part of his life, and died in extreme old age.

Two pleasing stories are related of him by early Christian writers, deserving of regard: one, that when too feeble to do more, he was wont to be carried into the assemblies of Christians at Ephesus, saying, as he went along, 'My little children, love one another.' The other respects his conduct to a young man who had joined a party of banditti. But when we read in those writers that he was thrown into a cauldron of boiling oil and came out unhurt, distrust arises, and we question the sufficiency of the evidence.

There is however little reason to doubt that he was at one period of his life banished to the island of Patmos, and that there he wrote the book called the 'Apocalypse,' or 'Revelation.'

There are also preserved three Epistles of his: but the most valuable of his writings which have descended to our time is the 'Gospel according to Saint John.' This Gospel is unlike the other three in several respects, and is supposed by those who have considered it to have been written with some especial purpose, either as a kind of supplement to the other Evangelists, which was the opinion of Eusebius, or with a view to the refutation of certain erroneous notions respecting our Saviour which had begun to prevail before the long life of Saint John was brought to a close. But with whatever design it was composed, it must ever be regarded as amongst the most valuable testimonies to the life, character, and doctrine of Jesus.

JOHN, king of England, surnamed Sansterre, or Lackland, a common appellation of younger sons whose age prevented them from holding fiefs, was the youngest of the five sons of Henry II. by his queen Eleanor of Guienne, and was born in the King's Manor House at Oxford, 24th December, 1166. In his youth he was created by his father earl of Montague in Normandy; and in 1176 he was contracted in marriage to Johanna (or Hadwisa, as she is called by some authorities), the youngest daughter of William earl of Gloucester (son of the great Earl Robert, natural son of Henry I.), who thereupon made Johanna his sole heir. The marriage was actually celebrated, 29th August, 1189. Henry, having after his conquest of Ireland obtained a bull from the pope authorising him to invest any one of his sons with the lordship of that country, conferred the dignity upon John in a great council held at Oxford in 1178. In March, 1185, John went over to take into his own hands the government of his dominions; but the insolent demeanor of the prince and his attendants so disgusted and irritated the Irish of all classes, that his father found it necessary to recal him in the following December. John however was his father's favourite son, in part perhaps from the circumstance that his youth had prevented him from joining in any of the repeated rebellions of his brothers; and it is said, that a suspicion began to be at last entertained by Richard, when, of the five brothers, he and John alone survived, that Henry intended to settle the crown of England upon the latter. According to this story, it was chiefly to prevent such an arrangement that Richard, joining Philip of France, flew to arms in January, 1189; but if so, it is difficult to account for the fact that John himself was found to be upon this occasion in confederacy with his elder brother, a discovery which was only made by their heart broken father upon his deathbed. [HENRY II.]

No opposition was offered by John to the accession of Richard, who endeavoured to attach him by the gift of such honours and possessions as amounted almost to sharing the kingdom with him. In addition to his Norman earldom of Montague, and that of Gloucester, which he acquired by his marriage, those of Cornwall, Dorset, Somerset, Nottingham, Derby, and Lancaster were bestowed upon him, so that there was thus placed under his immediate jurisdiction nearly a third of England. Richard however had not been long absent when his ambitious brother proceeded to take his measures for at least securing the crown to himself in case of the king's death, if not for an earlier seizure of it. The person next in the regular line of succession was Arthur, duke of Brittany, the son of John's elder brother Geoffrey, an infant of little more than two years old at the accession of Richard, who however recognised him as his heir, and had desired that his rights should be maintained by William de Longchamp, the bishop of Ely, whom during his absence he left in charge of the government. John accordingly directed his first efforts to the removal of the bishop, which, having obtained the co-operation of a strong party of the barons, he at length accomplished by actual force, in October, 1191. When the intelligence of Richard's captivity arrived in 1193, John at once openly took steps for the immediate usurpation of the throne. Repairing in haste to Paris, he secured the aid of Philip Augustus by the surrender of part of Normandy, and then, returning to England, proceeded to collect an army for the maintenance of his pretensions. In this attempt however he was successfully resisted by the loyal part of the nobility; and he also failed in his endeavours to induce the emperor, by the promise of a large bribe, to retain his brother in prison. On the return of Richard to England, in March, 1194, John's castles and estates were seized by the crown, and he and his chief adviser, Hugh, bishop of Coventry, were charged with high treason. John fled to Normandy, whither he was followed by the king at the head of an army; but the traitor made his peace by an abject submission, and, his mother seconding his supplications for pardon, he was allowed to retain his life and his liberty, and even restored to some measure of favour, though the restitution of his castles and territorial possessions was for a time firmly refused. Even that however was at length granted to his importunities and those of his mother; and it is further said, that Richard, when on his deathbed, was induced to declare John his successor.

John was present when Richard expired at Chaluz, 6th April, 1199, and before visiting England he hastened to secure the submission of the various continental territories of the crown. Upon repairing to Anjou, and the other original possessions of the Plantagenets, he found the prevalent feeling strongly in favour of his nephew Arthur; but both in Normandy, and also in Poitou and Aquitaine, where his mother's influence was predominant, his pretensions were readily acknowledged. Meanwhile in England, by the activity of the justiciary Fitz-Peter, a unanimous resolution to receive him as king had been obtained from a great council held at Northampton. Soon after this John made his appearance in person; and he was solemnly crowned at Westminster, on the 26th of May, the festival of the Ascension. The years of his reign are reckoned from Ascension-day to Ascension-day.

Philip Augustus having, for his own purposes, espoused the cause of Arthur, whom he had got into his possession, soon overran both Normandy and Anjou; but in May, 1200, John purchased a peace by a heavy pecuniary payment and the cession of several towns and other territories to the French king, who on his part relinquished such of his conquests as were not thus permanently made over to him, and also compelled Arthur to do homage to his uncle for Brittany. The next year John, having become tired of his wife, or never having been attached to her, procured a divorce on the plea of consanguinity, and married Isabella, daughter of Aymar count of Angoulême, who had already been betrothed, and even privately espoused, to Hugh count of La Marche. The complaints of the count in consequence of this injury gave Philip such a pretence as he wanted for renewing the war: he immediately took Arthur again by the hand, and putting him forward as the legitimate lord of the old fiefs of the Plantagenets, rapidly obtained possession of all the most important towns and places of

strength in those countries. Arthur however, while he was besieging the castle of Mirabeau in Poitou, which was held by John's mother, Queen Eleanor, was taken captive by his uncle (1st August, 1202): the unfortunate young prince was immediately consigned to close custody in the castle of Falaise, from which he was soon after removed to Rouen, and having never been seen more, was universally believed to have been there put out of existence by his uncle's order. Indeed, it was generally said that he had been murdered by John's own hand, an imputation which the latter never took the trouble to deny. Arthur's sister Eleanor, to whom devolved his claim to the inheritance of the English crown, was carried over to England, and confined in the castle of Bristol, in which prison she remained till her death in 1241. Notwithstanding the capture of Arthur however, the war in France went wholly against John; and before the end of the year 1204 Normandy, Anjou, Maine, and Touraine were rent from the crown of England, and re-annexed to that of France, from which they had been separated for nearly three centuries. Two years afterwards John made an unsuccessful attempt to recover what he had thus lost.

While still at war with France, John became involved in another contest at home, which was eventually attended with still more fatal results. By insisting upon the right of the crown to nominate the archbishop of Canterbury, on that see becoming vacant in July, 1205, he drew upon himself the formidable hostility of the whole body of the national clergy, and also of the able and imperious pontiff who then presided over the Western Church. [INNOCENT III.] John paid little regard either to the interdict under which his kingdom was laid in 1208, or to the bull of excommunication issued against him the following year, or even to that deposing him and absolving his subjects from their allegiance, which Innocent launched at him in 1212. In the midst of all this ecclesiastical thunder he chastised the Scottish king William, compelling him, in 1209, to avert further hostilities by the payment of a large sum of money, and the delivery of his two daughters, with other hostages, as pledges for his observance of his engagements; he passed over to Ireland in 1210, and reduced a rebellion of the English chieftains there; and in 1212 he marched into Wales, and compelled Llewellyn, the prince of that country, to make his submission. In the last-mentioned year he also put down a confederacy of certain of his barons, which had been formed with the object of seizing his person.

At last however Innocent had recourse to more effective arms than his apostolic artillery. At the instigation of the pope, Philip Augustus prepared to invade England; and though John at first attempted to meet this threatening danger with some spirit, by conducting an army to France in April, 1213, he soon returned home without having done anything; and in the despair produced by the universal hatred in which he found himself to be held by his subjects, whom his lawless and oppressive government had long alienated and disgusted, he consented, at Dover, 13th May, 1213, in an interview with Pandulf, the papal legate, to submit to all the demands of the holy see, of which the admission of the pope's nominee, Stephen de Langton, to the archbishopric of Canterbury, was the first. Two days after he made over to the pope the kingdoms of England and Ireland, to be held of him and of the Roman Church in fee, and took to his holiness the ordinary oath taken by vassals to their lords. It was now agreed that there should be an oblivion of the past on both sides, that the bull of excommunication should be revoked by the pope, and that of John's disaffected English subjects those who were in confinement should be liberated, and those who had fled or been banished beyond seas should be permitted to return home. Philip, whose ambition was mortified by this pacification, would have persisted in his project of invasion, even in opposition to the express commands of the pope, but he was compelled to disband his army by the result of a battle fought in June, between the English and French fleets, in the harbour of Damme, the first great victory in the naval annals of England, in which 300 of his vessels were captured, above 100 burned, and all his military stores and provisions, as well as his means of conveyance, taken from him.

One effect of this victory however was immediately to beget in John a hope of being able to extricate himself from his late engagement in favour of the exiles and outlaws, and perhaps also from the vassalage in which he had bound himself and his kingdom to the pope. In this view he at first attempted to raise an army with which to invade France, before doing anything in fulfilment of his promises either to the barons or the Church; but finding that the opposition of these united powers was too strong for him, he changed his course of proceeding, and temporised with both, until, by further submissions to the new papal legate, the Cardinal Nicholas, who arrived in England in the end of September, if he did not gain over the national clergy, he at least converted the pope himself, from being the head of the confederacy against him, into his friend and supporter. The Primate Langton however, greatly to his honour, still continued to make common cause with the barons. Langton had already, in a meeting held at St. Alban's, 25th August, proposed to the barons to rally round the charter of Henry I., and had solemnly sworn them to hazard their lives in the maintenance of the rights and liberties therein recognised. For a short time the commencing strife was appeased by an award of the pope; soon after which, in June, 1214, John hastened over to France, where however the great victory of Bouvines, gained by Philip, 27th July, over the allied army of the English under John's bastard brother, the earl of Salisbury, the forces of the emperor, of the earl of Flanders, and of the earl of Boulogne, compelled the English king to sue for a cessation of hostilities. On the 19th October a truce was arranged between the two kingdoms, to last for five years. But the depressed state of John's affairs now presented to his barons an opportunity for the renewal of their demands, of which they hastened to avail themselves. Their first memorable assemblage, in which they concerted their plans, was held, under pretence of celebrating the festival of the Saint, in the abbey of St. Edmund at Edmondsbury, on the 20th of November. Before they separated they advanced one by one to the high altar, and laying their hands upon it, took a solemn oath to withdraw their fealty, and levy war upon John, if he should refuse their demands, and never to lay down their arms till they had obtained from him a charter confirming the national liberties. Their petition was formally presented to John in the Temple, at London, on the feast of the Epiphany, the 6th of January following. On its rejection, both parties, after an appeal to the pope, who at once took the part of John, prepared for war. In the beginning of May, 1215, the barons having mustered their forces, which they put under the command of Robert Fitzwalter, and designated by the title of the army of God and of his Holy Church, proceeded to lay siege to the castle of Northampton. After wasting a fortnight however they were obliged to retire from this fortress; but having then marched to London, they were gladly received by the citizens, 17th May, and immediately took possession of the town. On this John consented to a conference, and the celebrated meeting on the plain of Runnymead, which lay about half-way between London and Odiham, in Hampshire, whither John had retired, was held in consequence on Trinity Monday, the 15th June. The result was, the concession and signature by John of the Great Charter, embodying all the barons' demands. [MAGNA CHARTA.]

Scarcely however had the charter been thus extorted, when John set himself to work to endeavour to escape from its obligations. The suspicions excited by his general conduct, and especially by his introduction into the kingdom of numerous bodies of foreign troops, again called up the barons in arms by the following October. At first the new contest ran strongly in favour of the king; William D'Albiney, who, by the direction of the insurgent leaders, had thrown himself into the castle of Rochester, was, after sustaining a siege of seven weeks, compelled to surrender at discretion: news soon after arrived that the pope, as requested by John, had annulled the charter; this intelligence was followed by other papal bulls suspending Archbishop Langton, excommunicating the chiefs of the barons by name, and laying the city of London under an interdict; and John was soon enabled to wreak his vengeance on his enemies almost without encountering any resistance. While one part of his army, under the command of the earl of Salisbury, wasted the counties around the metropolis, where the chief strength of the barons lay, he himself, with another force, proceeded to the north, where he drove back their ally, Alexander, the young king of Scotland, pursuing him as far as Edinburgh, and reducing to ashes every town, village, and castle, on both sides of the border, that fell within the range of his furious progress. In these

disastrous circumstances, the barons congregated in London resolved, after much debate, upon the desperate expedient of offering the crown to Louis, the dauphin of France, as the only chance left to them of preserving any part of the national liberties. Accepting the invitation, Louis set sail from Calais with a fleet of six hundred and eighty sail, and, on the 30th of May, 1216, landed at Sandwich. John retired to the west at his approach, and the French prince, after attacking and easily reducing the castle of Rochester, immediately marched to the capital. The fortune of the contest now turned. The people in all parts of the country eagerly rallied around Louis; even his foreign auxiliaries, most of whom were Frenchmen, began to quit the standard of the English king, and either to join that of the invader or to return home. At this critical moment arrived the news of the death of John's powerful friend Pope Innocent III. (16th July). Still however most of the places of strength were in his hands; and some months were spent to little purpose by the adverse party in attempts to reduce Dover, Windsor, and other castles which were occupied by his garrisons. Meanwhile, in the disappointment produced by the protraction of the war, jealousy of their foreign allies was beginning to spread among the insurgents; and it is very doubtful what the issue of the struggle might have been if the life of John had been prolonged. But on the 14th of October, as he was attempting to ford the Wash at low-water, from Cross-keys to the Foss-dyke, and had already got across himself with the greater part of his army, the return of the tide suddenly swept away the carriages and horses that conveyed all his baggage and treasures; on which, in an agony of vexation, he proceeded to the Cistercian convent of Swineshead, and was that same night seized with a violent fever, the consequence probably of irritation and fatigue, but which one account attributes to an imprudent indulgence at supper in fruit and new cider; another to poison administered to him by one of the monks. Although very ill, he was conveyed the next day in a litter to the castle of Sleaford, and thence on the 16th to the castle of Newark, where he expired on the 18th, in the forty-ninth year of his age, and the seventeenth of his reign.

All our historians paint the character of John in the darkest colours; and the history of his reign seems to prove that to his full share of the ferocity of his race he conjoined an unsteadiness and volatility, a susceptibility of being suddenly depressed by evil fortune and elated beyond the bounds of moderation and prudence by its opposite, which give a littleness to his character not belonging to that of any of his royal ancestors. He is charged in addition with a savage cruelty of disposition, and with the most unbounded licentiousness: while on the other hand so many vices are not allowed to have been relieved by a single good quality. It ought to be remembered however that John has had no historian; his cause expired with himself, and every writer of his story has told it in the spirit of the opposite and victorious party. In regard to what has generally been accounted the act most decisive of the baseness of his character, his surrender of his kingdom in vassalage to the pope, we may observe that Dr. Lingard has lately advanced some considerations tending to show that it does not deserve to be viewed in the light in which it has been usually regarded.

The children of John by his queen Isabella of Angoulême were:—1. Henry, who succeeded him as Henry III.; 2. Richard, born January 5, 1208, created earl of Cornwall 1226, elected king of the Romans 1257, died 2nd April, 1272; 3. Joan, married June 25, 1221, to Alexander II. of Scotland, died March 4, 1238; 4. Eleanor, married, first, 1235, to William Marshall, earl of Pembroke, secondly, 1238, to Simon Montfort, earl of Leicester; and 5. Isabella, born 1214, married 20th July, 1235, to Frederic II., emperor of Germany, died 1st December, 1241. Several natural children are also assigned to him, none of whose names however make any figure in our history.

JOHN OF GAUNT. [EDWARD III.; HENRY IV.]

JOHN, Kings of Portugal. [PORTUGAL.]

JOHN OF SALISBURY finds a place, and very deservedly, in every catalogue of learned Englishmen. His æra was the reign of King Henry II., which, according to a very common but an incorrect mode of speaking, is called a dark age; for an age cannot possibly be dark which had such men living in it as this John, Peter of Blois, Thomas à Becket, and many others, especially historians, whose writings still remain to show what kind of men they were, and to attest the great extent of their reading and the general intellectual power which they had acquired. John had studied at Oxford, but he visited also the universities of France and Italy. In fine, if we may trust Leland, an excellent authority, he was intimately acquainted with the Latin and Greek writers; he had some knowledge of Hebrew; he was skilled in the mathematics and every branch of natural philosophy, as he was also in theology and morals; he was an eloquent orator and an eminent poet. Leland further says of him that he was possessed of the most amiable dispositions, ever cheerful, innocent, and good.

He was much connected with Becket, archbishop of Canterbury, the murder of whom is one of the dark stains on the reign of Henry II. Peter of Blois, in the twenty-second of his Epistles, which are collected and printed, calls John the eye and hand of the archbishop. John became himself bishop of Chartres in 1164. He died in 1182.

His principal historical writings were Lives of two archbishops of Canterbury, Anselm and Thomas à Becket. But the work by which he is best known to scholars, for the curious matter which it contains can scarcely be said to have found its way into the vernacular literature of his own or any other country, is entitled 'Polycraticon, de Nugis Curialibus et Vestigiis Philosophorum,' in which he describes the manners of the great, speaking not unfrequently in the style of sharp satire. There is an edition of it at Paris, 1513, and another at London, 1595. A large catalogue of his writings may be seen in Pitz and other writers of that class.

Mr. Berington has devoted several pages to John of Salisbury in his 'Literary History of the Middle Ages,' 1810, pp. 315-320.

JOHN HYRCA'NUS. [HYRCANUS, JOHN.]

JOHN I., a native of Tuscany, succeeded Hormisdas in the see of Rome, A.D. 523. He was employed by King Theodoric on a mission to the Emperor Justin of Constantinople; but after his return, from some unknown cause, he incurred the displeasure of Theodoric, and was put in prison, where he died, A.D. 526.

JOHN II. succeeded Boniface II. A.D. 532, being elected by the clergy and the people of Rome, and confirmed by King Athalaric, for which confirmation a certain payment was fixed by an edict of the same king. He died in 535.

JOHN III., a native of Rome, was elected to succeed Pelagius I. in the year 560, and was confirmed by the exarch of Ravenna in the name of the Emperor Justinian. Two French bishops, of Embrun and of Gap, having been deposed by local councils, appealed to John, who ordered their restoration, which Gontram, the Burgundian king, enforced in opposition to the French clergy, who asserted their independence of the Roman see. (Dupin, *De Antiqua Eccles. Discipl.*) John died in 574.

JOHN IV., a native of Dalmatia, succeeded Severinus in 640. He condemned the heresy of the Monothelites [EUTYCHIANS], and died in 642.

JOHN V., a native of Syria, succeeded Benedict II. in 686, and died after a few months.

JOHN VI., a native of Greece, succeeded Sergius I. in 702. In a council which he held at Rome he acquitted Wilfred, archbishop of York, of several charges brought against him by the English clergy. He died in 705.

JOHN VII., also a Greek, succeeded John VI., and died in 707.

JOHN VIII., who has been styled the IX. by those who believed in the story of Pope Joan, whom they style John VIII. [JOAN, POPE], succeeded Adrian II. in 872. He crowned Charles the Bald emperor, and after him also Charles the Fat. He confirmed the exaltation of Photius to the see of Constantinople. He had disputes with the marquises of Tuscany and the dukes of Spoleto, and died in 882, after a busy pontificate.

JOHN IX. was elected in 898, held two councils at Rome and Ravenna, and died about the year 900.

JOHN X. succeeded Lando in 915. He crowned Berengarius as king of Italy and emperor. The Saracens from Africa, who had landed in Italy and fortified themselves near the banks of the Liris, made frequent irruptions into the Roman territory. John, united with Berengarius and the dukes of Benevento and Naples, marched in person against them, and completely routed and exterminated them. The famous Marozia, a Roman lady of very loose

conduct, and her husband, Guido, duke of Tuscany, ruled at Rome by force and intrigue. John, having had repeated disputes with them, was at length seized by their satellites in his palace of the Lateran, and thrown into prison, where he was put to death, according to report, A.D. 927.

JOHN XI., son of Marozia, succeeded Stephen VIII. in 931. His brother Alberico headed a revolt of the Romans against his mother, who was secured in prison, and her new husband King Hugo was driven away from the city. John himself was closely watched by his brother, and died in the year 936, not without suspicion of violence.

JOHN XII., originally called Octavianus, son of Alberico and grandson of Marozia, succeeded Agapitus in 956, while he was only in his 19th year. In 960 he crowned at Rome Otho I. of Germany as emperor and king of Italy. But some time after the complaints against his licentious conduct became so loud, that the emperor returned to Rome, and there in an assembly of the clergy caused John to be deposed and Leo VIII. to be elected in his stead, in 963. In the following year however John re-entered Rome at the head of numerous partisans, drove out Leo, and committed many acts of cruelty. Otho, who was then in the north of Italy, was preparing to return to Rome at the head of his troops, when John fell suddenly ill, and died in 964. Panvinius, in a note to Platina's account of Pope Joan, suggests that the licentiousness of John XII., who among his numerous mistresses had one called Joan who exercised the chief influence at Rome during his pontificate, may have given rise to the story of 'Pope Joan.'

JOHN XIII., bishop of Narni, succeeded Benedict V. in 965, with the approbation of the emperor Otho, but soon after the Romans revolted and imprisoned John. Otho however marched to Rome, reinstated John, and hanged thirteen of the leaders of the revolt. John crowned at Rome Otho II., son and successor of Otho I., and died in 972.

JOHN XIV., bishop of Pavia and chancellor to Otho II., succeeded Benedict VII. in the see of Rome in 983. Boniface VII., an intruder, entered Rome soon after, and put John in prison, where he died of violence, after a pontificate of only nine months.

JOHN XV. (styled XVI. by some who place before him another John, who is said to have lived only a few days after his election) was elected in 985. The disturbances of the patrician or consul Crescentius began in his pontificate. John however remained at Rome, and kept on good terms with Crescentius. He died in 996.

JOHN XVII., a Calabrian and bishop of Piacenza, was appointed pope in 997 by Crescentius, in opposition to Gregory V., but Otho III. came to Rome, imprisoned and mutilated John, and put to death Crescentius and his partisans. [GREGORY V.] John however is generally numbered in the series of the Popes.

JOHN XVIII. succeeded Sylvester II. in 1003, and died four months after his election.

JOHN XIX. succeeded the preceding, and died about 1009. The history of the popes during this period is very obscure, and the chronology confused.

JOHN XX., son of Count Gregory of Tuscany, succeeded his brother Benedict VIII. in the year 1024. He crowned the Emperor Conrad, and died in 1034.

JOHN XXI., a native of Lisbon, succeeded Adrian V. in 1277, and died about three months after.

JOHN XXII., James of Cahors in France, succeeded Clement V. in 1316, and, like him, took up his residence at Avignon. He was a man of considerable abilities, but he has been taxed with avarice and worldliness. The crown of Germany was then contested between Louis of Bavaria and Frederic of Austria, and John, assuming the right of deciding, excommunicated Louis. But this measure produced little effect in Germany; the diet of Frankfort declared that the imperial authority depended upon God alone, and that the pope had no temporal authority, direct or indirect, within the empire. In Italy however John met with greater success; his ally, Robert, king of Naples, defeated the Guibelines, and the pope excommunicated Matteo Visconti, the great leader of that party, and likewise Frederic, king of Sicily. Between Guelphs and Guibelines, Italy was at that time in a dreadful state of confusion. The pope preached a crusade against Visconti, Cane della Scala, and the Este, as heretics. Robert, with the assistance of the pope, aspired to the dominion of all Italy, and the pope sent a legate, who, at the head of an army, assisted Robert and the other Guelphs against the Guibelines of Lombardy. But the Guibelines had clever leaders; Castruccio Castracani, Cane della Scala, and the Visconti kept the fate of the war in suspense, and Louis of Bavaria sent troops to their assistance. Louis came himself to Italy in 1327, and after being crowned at Milan with the iron crown, he proceeded to Rome, where the Colonna and other Guibelines roused the people in his favour, and drove away the papal legate. Louis was crowned emperor in St. Peter's by the bishops of Venice and of Aleria, after which he held an assembly in the square before the church, in which he summoned James of Cahors (meaning the pope) to appear to answer the charges of heresy and high treason against him. After this mock citation, the emperor proceeded to depose the pope and to appoint in his stead Peter de Corvara, a monk of Abruzzo, who assumed the name of Nicholas V. Louis also proclaimed a law, which was sanctioned by the people of Rome, to the effect that the pope should reside at Rome, and if absent for more than three months, should be considered as deposed. Louis now returned to the north of Italy, and thence to Germany. Castruccio and Cane della Scala died, and the Guelphs and the papal legate began to resume the preponderance. In 1334 John XXII. died at Avignon, leaving the affairs of Italy as embroiled as ever, and 18 millions of golden florins in his coffers, besides jewels. It was under his pontificate that the clergy and people of the towns were deprived of the right of electing their bishops, which right he reserved to himself, on payment of certain fees by the person elected. He was also the inventor of the ANNATES, or FIRST FRUITS.

JOHN XXIII., Cardinal Cossa, succeeded Alexander V in 1410. He supported the claims of Louis of Anjou against Ladislaus, king of Naples; but the latter, having defeated his rival in battle, advanced to Rome, and obliged the pope to escape to Florence. John preached a crusade against Ladislaus, which gave occasion to denunciations and invectives from John Huss. Meantime the great schism continued, and Gregory, styled XII., and Benedict, antipope, divided with John the homage of the Christian states. John in his exile, wishing to secure the favour of the Emperor Sigismund, proposed to him the convocation of a general council to restore peace to the church, and Sigismund fixed on the city of Constance as the place of assembly. On hearing of the death of Ladislaus, by which event Rome became again open to him, John repented of what he had proposed, but was obliged to comply with the general wish by repairing to Constance. The fathers of the council decided that John, as well as his two rivals, should renounce their claims to the papacy as the only means of restoring peace. John signed the form of renunciation, but soon after, by the assistance of Frederic of Austria, he was conveyed out of the city, and resumed his authority by ordering the council to dissolve. But the council, in its fourth and fifth sessions, decided by a solemn decree that the general council once assembled is superior to the pope, and can receive no orders from him. A formal process being instituted against John, sixty charges were laid against him, of which only part were made public. Witnesses being heard, a solemn deposition was pronounced on the 29th May, 1415, to which John submitted, and was then given into the custody of the elector palatine. After the election of Martin V. and the termination of the council of Constance, John, now again Balthazar Cossa, escaped from Germany, and made his submission to the new pope, who treated him kindly and gave him the first rank among the cardinals. He died soon after.

JOHN'S COLLEGE, ST., OXFORD, was founded by Sir Thomas White, Knt., alderman of London, in 1557. It consists of a president, fifty fellows and scholars, one chaplain, an organist, six singing-men, six choristers, and two bible-clerks. All the fellows, except six of the founder's kindred, and two from Coventry, two from Bristol, two from Reading, and one from Tunbridge schools, are elected from Merchant Taylors' School, London.

The older buildings of St. John's College are those of St. Bernard's College, founded in the time of Henry VI., by Archbishop Chichele, for scholars of the Cistercian order. King Henry VIII. had granted these premises to Christ Church, Oxford, from which college Sir Thomas White purchased them, under a licence from the crown, in 1555. The second quadrangle of St. John's was entirely built at the expense of Archbishop Laud. It was begun in 1631,

and completed in 1635, from a design furnished by Inigo Jones.

Among the greater benefactors to this College, after the founder, were Dr. John Buckeridge, bishop of Ely, and the Archbishops Laud and Juxon, all of whom were presidents, and the last two successively; Dr. Richard Rawlinson, and Dr. William Holmes, the last of whom was also president from 1728 to 1748, from whom and from whose widow, who followed up her husband's intentions, the College received no less a sum than 15,000*l.*

Among the more eminent members of this College, beside those already mentioned, were Archbishop Tobie Matthew, and Peter Mews, afterwards bishop of Winchester, who were also presidents; Sir William Dawes, afterwards archbishop of York; Campian, the celebrated Jesuit; Sir James Whitelocke; Shirley, the dramatist; Sir Bulstrode Whitelocke; Sir John Marsham, the chronologist; Dr. Edward Bernard; Sherrard and Dillenius, the botanists; and Dr. Tucker, dean of Gloucester.

From the founder's endowment, and by means of other benefactions, this College is possessed of the following livings:—the *rectories* of Aston-le-Wall, Creek, and East Farndon, in Northamptonshire; Baynton in Yorkshire; Bardwell in Suffolk; Barfreston in Kent; Belbroughton in Worcestershire; Cheam in Surrey; Codford St. Mary in Wilts; Handborough and Tackley in Oxfordshire; Kingston Bagpuze in Berks; Sutton in Bedfordshire; Leckford and South Warnborough in Hampshire; Winterburne in Gloucestershire; and Cranham in Essex; the *vicarages* of Chalfont St. Peter in Buckinghamshire; Charlbury and Kirtlington in Oxfordshire; St Giles's in the suburbs of Oxford; Fyfield and St. Lawrence Reading in Berkshire: St. Sepulchre's, London; Linton in Herefordshire; and Stoughton Magna in Huntingdonshire; and the *curacies* of Frenchay in Gloucestershire, and Summer-town Chapel in the suburbs of Oxford.

The present number of members of this College, dependent and independent, is 226, exclusive of the choir.

(Gutch's *Colleges and Halls of Oxford*: Chalmers's *Hist. of the Univ.*; *Oxford Univ Calendar* for 1838.)

JOHN'S COLLEGE, ST., CAMBRIDGE, was projected and begun by Margaret countess of Richmond, a short time before her death, which happened in 1509. It was completed by her executors, under the authority of a papal bull and the royal mandates of her son and grandson King Henry VII. and King Henry VIII., which gave them the power of suppressing a decayed hospital dedicated to St. John, at that time existing on the same site. The College, then consisting only of the present first court, was four years in building: the fabric is said to have cost between four and five thousand pounds. The statutes of the College were given by Henry VIII.; but these having become confused and ambiguous, owing to various changes, erasures, and marginal notes, Queen Elizabeth gave the College a new set of statutes.

The original endowment was for fifty fellows; but part of the foundation-estates having been seized by King Henry VIII., the funds were found to be sufficient for thirty-two only. These fellowships are (by letters patent from Geo. IV. on the petition of the college, and in pursuance of a power to that effect said to be reserved to the crown by the statutes of Henry and Elizabeth) now open to natives of England and Wales, without any restriction or appropriation whatsoever, one only excepted, which is in the appointment of the bishop of Ely; but the bishop is required, agreeably to an arrangement between James Stanley bishop of Ely, and the executors of the countess of Richmond, to elect according to the statutes in every respect.

There are also twenty-one fellowships founded by different benefactors, which have all the privileges of the former, and give an equal claim to the college patronage.

Besides these there are numerous scholarships, exhibitions, &c. belonging to this college: the former amount to no fewer than 114.

The present buildings consist of the first court, a second court of large dimensions, and a third, which contains the library. A handsome new court has recently been built by Rickman on the opposite side of the river Cam, and is connected with the old buildings by a bridge.

This being a divinity college, all the fellows are obliged to take priest's orders within six years from the degree of M.A., except four, who are allowed by the master and seniors to remain laymen; two for the practice of physic, and two for law. The rest must proceed to the degree of B.D. at the regular time. The electors to fellowships are the master and eight senior resident fellows. The visitor is the bishop of Ely. The number of persons on the boards of this college, March 12th, 1838, was 1096. The schools of Pocklington and Sedburgh in Yorkshire, Shrewsbury in Salop, Rivington in Lancashire, Stamford in Lincolnshire, and Aldenham in Herts, are in the patronage of this college: the benefices in the gift of this college are the rectories of Houghton Conquest with Houghton Gildaple, Marston Mortaine, and Mapershall, in Bedfordshire; the vicarages of Aldworth and Sunninghill, in Berks; the rectories of Brinkley and Fulbourn, and the chapel of Horningsea, in Cambridgeshire; the rectory of Aberdaron in Caernarvonshire; those of Morton in Derbyshire and Marwood in Devonshire; of Fratring cum Thorington, Lawford, Morton, Oakley Magna, and Warley Magna, in Essex; the vicarage of Hormead Magna, and the rectories of Hormead Parva and Lilly, in Herts; of Freshwater in Hants: the vicarages of Higham and Ospringe, and the rectories of Murston and Staplehurst, in Kent; the vicarage of Barrow on Soar, and the rectory of Medbourn cum Holt, in Leicestershire; the vicarage of Minting, in Lincolnshire; the rectories of Thurston cum Snoring, Holt, Ditchingham, Fornset, Sterston, South, and Aldburgh, and the vicarage of Cherry Marham, in Norfolk; the rectory of Ufford cum Bainton, in Northamptonshire; the vicarage of North Stoke, and the rectory of Souldern, in Oxfordshire; the rectories of St. Florence, in Pembrokeshire; of Barrow, Cockfield, and Leyham, in Suffolk; of Wootton Rivers, in Wilts; of Brandeston, and Holme including the vicarage of Holme in Spalding Moor, and the vicarage of Marton cum Grafton, in Yorkshire. (Lysons's *Magna Britan.*, 'Cambr.,' and the *Cambr. Univ. Calendar* for 1838.)

JOHN'S, ST. [NEWFOUNDLAND.]

JOHN'S, ST. [NEW BRUNSWICK.]

JOHN'S, ST., RIVER. [MAINE.]

JOHNSON, SAMUEL, the son of Michael Johnson, a bookseller at Lichfield, and Sarah, his wife, was born at Lichfield on the 18th of September, 1709. As a child he was afflicted with the king's evil, which disfigured his face and impaired his eyesight, and he was taken to Queen Anne to be touched. His education was commenced at Lichfield, whence he was removed to a school at Stourbridge; and in 1728, two years after he had left Stourbridge, he was placed at Pembroke College, Oxford. Young Johnson had early shown a vigorous understanding and an eagerness for knowledge: though he had poverty to contend with and a natural indolence, and was also subject to periodical attacks of morbid melancholy, he acquired a large fund of information at the university. Necessity compelled him to abandon the hope of taking a degree; his debts, though small, were increasing; remittances from Lichfield could no longer be supplied; and he quitted college and returned to his father's house. In the December following (1731) his father died in such pecuniary distress, that Johnson was soon afterwards glad to become usher of a school at Market Bosworth, in Leicestershire, to which, it appears from his diary, that he went on foot: 'Julii 16,' he writes, 'Bosvortiam pedes petii.' But finding the drudgery of this employment intolerable, he sought other means of obtaining his bread, and procured temporary employment in translating for a bookseller in Birmingham. During his residence in this town he became intimate with the family of a mercer named Porter, whose widow he subsequently married (1736). Mrs. Porter was more than twenty years older than himself, but he was fondly attached to her, and she added to other powers of increasing his happiness the possession of 800*l.* With this capital he established a school, but his advertisements produced few scholars, the scheme failed, and he left Staffordshire with his pupil Garrick to seek his fortune in the metropolis. His prospects must have been very gloomy: he had nothing but literature to trust to for subsistence, and those were times when the condition of literary men was most miserable and degraded. In the reigns of William, of Anne, and George I., successful writers were rewarded by private munificence and public situations. But such patronage was now at an end; and the year in which Johnson left his home formed part of an interval which elapsed before a new source of remuneration arose—before the number of readers became large. Of readers there were still but few; the prices therefore that booksellers could afford to pay to authors were necessarily

small, and an author, whatever were his talents or his industry, had great difficulty in keeping a shilling in his purse. The poverty and neglected condition of his friend and brother author Savage were the causes of Johnson's writing his 'London,' an imitation of the third satire of Juvenal, for which Mr. Dodsley gave him ten guineas, and by which he obtained a certain degree of reputation. We are told that when Pope read it he said, 'The author, whoever he is, will not be long concealed.' No great advantage however immediately accrued to him. Again he sought to be a schoolmaster, again his scheme miscarried, and he returned to his drudgery in the service of Cave the bookseller, who was his only patron. His pen was continually at work, and his pamphlets, prefaces, epitaphs, essays, and biographical memoirs, were continually published by Cave, either by themselves or in his periodical the 'Gentleman's Magazine.' For many years his bread continued to be earned by literary slavery; by slow degrees only did his great talents become known, and the trust reposed in him by publishers increase. In 1740, and for more than two years afterwards, he wrote the parliamentary speeches in the 'Gentleman's Magazine.' In 1744 he published his 'Life of Savage;' in the following year some observations on Shakspeare, whose plays he proposed to edit; and in 1747 he commenced his 'English Dictionary,' which he engaged to complete in three years for 1575*l.*, a small sum if we consider that the author agreed to bear the heavy expenses necessary for preparing a work of such magnitude and importance. In 1749 appeared 'The Vanity of Human Wishes,' an imitation of the tenth satire of Juvenal; and in the following year was printed the first paper of the 'Rambler.' These are some of his most remarkable publications, for a complete list of which, and the dates at which they were published, we must refer to Boswell's 'Life.' For 'The Vanity of Human Wishes' 15 guineas only were received from Mr. Dodsley. We mention this because the frame and condition of Johnson's mind and temper, his views of things and persons, were influenced in no small degree by the deficiency of his means. He was now engaged in a steady course of occupation sufficient to employ his time for several years; and so assiduous were his labours, that at his residence in Gough Square he had an upper room fitted up like a counting-house, in which several copyists sat, whom he supplied with continual employment. The efforts of his mind were the utmost it could bear; and when it was subdued by grief at the death of his wife (1752), he relinquished the 'Rambler.' Bad as his circumstances were, still they were somewhat more easy than they had been: the number of his acquaintances had increased; the Dictionary, which occupied eight instead of the promised three years, was nearly complete; and he found leisure (in 1754) to make an excursion to Oxford for the purpose of consulting its libraries. This was his first emancipation from necessary labour. He soon returned to London to increase the number of reviews and essays, which flowed continually from his pen. Thus occupied, an offer of a living was made to him if he would take orders: but though he was a firm believer in revelation, and a somewhat rigid moralist, he could not overcome his scruples respecting the fitness of his temper and habits for the duties that would be required of him, and the offer was rejected. He continued therefore to write for his bread; and it was not until he was fifty-three years old, and had for thirty years been toiling with his pen, that any certain source of income was opened to him. In May, 1762, George III., through his minister Lord Bute, granted Johnson a pension of 300*l.* a year, and the days of his penury were at an end. Happy, in a state of independence, he enjoyed the society of a weekly club, of which Burke, Goldsmith, and Sir Joshua Reynolds were also members. He was introduced in the following year to his biographer Boswell, and we have from this date (1763) as full and minute account of him as has ever been written of any individual. From this time we are made as familiar as it is in the power of writing to make us with the character, the habits, and the appearance of Johnson, and the persons and things with which he was connected. 'Everything about him' (says the *Edinburgh Review*, vol. liii., p. 20), 'his coat, his wig, his figure, his face, his scrofula, his St. Vitus's dance, his rolling walk, his blinking eye, the outward signs which too clearly marked the approbation of his dinner, his insatiable appetite for fish-sauce and veal-pie with plums, his inextinguishable thirst for tea, his trick of touching the posts as he walked, his mysterious practice of treasuring up scraps of orange-peel, his morning slumbers, his midnight disputations, his contortions, his mutterings, his gruntings, his puffings; his vigorous, acute, and ready eloquence; his sarcastic wit, his vehemence, his insolence, his fits of tempestuous rage, his queer inmates—old Mr. Levett and blind Mrs. Williams, the cat Hodge, and the negro Frank—all are as familiar to us as the objects by which we have been surrounded from childhood.'

In 1765 the university of Dublin sent over a diploma creating him a doctor of laws, but he did not assume the title of doctor until eight or ten years afterwards, when the university of Oxford conferred the same honour upon him.

In 1766 his constitution seemed to be rapidly giving way, and he was depressed with a deep and gloomy melancholy. In this condition his friend Mr. Thrale received him into his house at Streatham; an apartment was fitted up for him, companions were invited from London, and he became a constant resident in the family. His celebrity attracted the notice of the king, to whom he was introduced by the librarian of Buckingham House. We are not told that politics had in any way led to this introduction, but it is not impossible that the opinions that Johnson entertained upon the principal questions of the day might have reached the king's ears. For several years he occasionally published political pamphlets. In the autumn of 1773 he made a tour, in company with Mr. Boswell, to the Western Islands of Scotland, of which he published an account. Two years afterwards he made a short excursion to Paris. The last of his literary labours was 'The Lives of the Poets,' which were completed in 1781. We now take leave of him as an author, and have only to record the few domestic occurrences which took place before the close of his long life. These are for the most part melancholy. His friends Mr. Thrale and Mrs. Williams preceded him to the grave. In June, 1783, he had a paralytic stroke, and in the following November was greatly swollen with the dropsy. During a journey to Derbyshire he felt a temporary relief; but in 1784 he suffered both from dropsy and from asthma. His diseases were evidently irremediable; the thought of death preyed upon his mind, and the history of his death-bed is painful. On Monday, the 13th of December, 1784, he expired in his house in Bolt-court; on the 20th of the month his remains with due solemnity and a numerous attendance of his friends were buried in Westminster Abbey, near the foot of Shakspeare's monument, and close to the grave of Mr. Garrick.

'The characteristic peculiarity of Johnson's intellect was the union of great powers with low prejudices. If we judged of him by the best parts of his mind we should place him almost as high as he was placed by the idolatry of Boswell; if by the worst parts of his mind, we should place him even below Boswell himself.' (*Edin. Review*, vol. liii., p. 27.)

Though poverty made him a pensioner and a ministerial partisan, he had great independence of character, and his Tory opinions are to be attributed to disinterested conviction, and were in harmony with his general spirit. He was steady and inflexible in maintaining the obligations of religion, a sincere and zealous Christian, and, as such, benevolent. Besides these great qualities he possessed others of a most humiliating littleness. In many respects he seemed a different person at different times. He was intolerant of particular principles, which he would not allow to be discussed within his hearing; of particular nations, and particular individuals. He was superstitious; and his mind was at an early period narrowed upon many questions religious and political. He was often the first to practise what he had censured in others, and this not from a passionate want of control, but from an ignorance of himself. 'He was no master of the great science of human nature; he had studied not the *genus* man, but the *species* Londoner.' He was open to flattery, hard to please, easy to offend, impetuous and irritable. These were the principal blots upon his character, but his great qualities predominated, and he has left more to admire and revere than to censure and condemn.

His reasoning was sound, dextrous, and acute; he was seldom imposed upon either by fallacies or exaggerated statements; his perception was quick; his thoughts striking and original, and his imagination vivid. In conversation his style was keen and pointed, and his language appropriate; he had also a remarkable facility of illustration

from familiar objects. His wit may be described as logical, and chiefly consisted in dextrously convicting his opponent of absurdity. Conscious of his power, he was fond of dispute, and used to argue for victory. Scarcely any of his contemporaries except Burke was a match for him in such discussions. His written style was eminently periodic; and in order to construct every sentence into a balanced period he frequently introduced superfluous and high-sounding expressions; hence his general style was pompous, heavy, bombastic, and diffuse. He was also fond of words of Latin derivation, to the exclusion of more familiar words of Saxon origin. A good burlesque of his style may be seen in the 'Rejected Addresses.'

Johnson's strong and penetrating intellect did not fit him for poetry. His 'Irene' is deservedly forgotten. His 'Imitation of the Third Satire of Juvenal' contains some nervous thoughts expressed in harmonious verse. His 'Imitation of the Tenth Satire of Juvenal' is a fine poetical declamation, though deformed by occasional tautology. Among his smaller pieces the two most remarkable are his verses on the opening of Drury-Lane Theatre in 1747, 1747, and the stanzas on the death of Mr. Levett; the latter of which is, in our opinion, the most poetical of Johnson's productions. His tale of 'Rasselas' holds an intermediate place between his poetry and his prose. It is characterized by a tone of pleasing melancholy, and the style, though somewhat artificial, is elegant and harmonious.

His prose works consist of short pieces, his Dictionary excepted. His 'English Dictionary' was a work of great labour, and the quotations are chosen with so much ingenuity, that, though necessarily mere fragments, they are amusing to read. Dr. Robertson, the historian, said that he had read Johnson's Dictionary from beginning to end. It is however in some respects a very defective work. Johnson had scarcely any knowledge of the Anglo-Saxon, and no knowledge of any of the cognate Teutonic dialects; accordingly the etymological part is not of much value; the etymologies being blindly copied chiefly from Skinner and Junius. His definitions are constructed without sufficient consideration, and without any systematic plan. He also frequently errs in tracing the successive significations of a word. Between 1750 and 1760 he published the 'Rambler' and the 'Idler,' periodical essays in the style of the 'Spectator.' Johnson was as little fitted for this species of composition as for poetry; his serious essays generally consist of trite morality, and his attempts at facetiousness are ponderous and clumsy. His edition of Shakspeare was published in 1765; the preface is one of his ablest productions, particularly that part which relates to the unities and dramatic illusion. He had not sufficient antiquarian knowledge or poetical feeling for commenting on Shakspeare; his notes are not numerous, and though marked with his strong sense are only occasionally valuable. In 1775 he published the account of his journey in the Hebrides, an entertaining and even an instructive work, though it discusses with needless solemnity subjects familiar to every inhabitant of the country, but strange to a townsman like Johnson. His 'Lives of the Poets,' published in 1781, are a useful and interesting contribution to English biography and criticism, and are too well known to require specific notice. The criticisms in this work are sometimes biased by political, religious, and even personal antipathies, as may be seen in his unfavourable judgment of Milton's poetry, dictated by his dislike for the republican and non-conformist; and his captious censure of Gray, which evidently proceeded from his jealousy of a successful contemporary. His judgments of the general character of a poet are however more frequently correct than his criticisms upon particular passages and expressions. His verbal criticisms on poetry are for the most part the mere cavillings of a prosaic grammarian.

A complete list of Johnson's works is prefixed to Boswell's 'Life;' but from what has been stated, it sufficiently appears that his intellectual efforts were desultory and unconnected, and took the form of Essays, Lives, Critical Notices, Prefaces, &c. He had no comprehensive or profound acquaintance with any department of human knowledge; he did not attempt any systematic investigation of any considerable branch of metaphysical, ethical, political, or æsthetical science. Even as a grammarian, his acquirements were shallow and limited; of physical and mathematical science he was quite ignorant. It may however be remarked that he had adopted that theory of ethics which is now commonly known by the name of *utilitarian*, as may be seen from his review of Soame Jenyns's 'Inquiry into the Origin of Evil,' his ablest speculative production. Johnson here says of this theory, that it affords 'a criterion of action on account of virtue and vice, for which he has often contended, and which must be embraced by all who are willing to know why they act or why they forbear, to give any reason of their conduct to themselves or others.'

From his habit of writing for the booksellers, he had acquired a power of treating the most heterogeneous subjects with scarcely any preparatory knowledge; witness his papers on the construction of Blackfriars Bridge, and his argument, dictated to Boswell, on a question of Scotch law. In English literature his reading was extensive, particularly in the writers of the seventeenth and eighteenth centuries; but he seems to have known little about the writers of the age of Elizabeth: his 'Lives of the Poets' begin with Cowley. He had not studied attentively the works of any of the chief English philosophers, as Bacon, Hobbes, Locke; his theological learning was scanty; nor was he well versed in the political history or laws of his country. He had a fair acquaintance with the ordinary Latin classics; of Greek he knew but little. He could read French and Italian; but he seems to have been nearly ignorant of the modern literature of foreign countries.

Johnson's opinions were regarded by many of his contemporaries with a sort of superstitious reverence, and even his style was considered worthy of imitation. In the present generation his credit has perhaps fallen lower than it deserves. Many of his works will long continue to be read, if not for their intrinsic value, at least from the vigour of thought which they display.

(Murphy's *Life*, in preface to Works; Boswell's *Life*, Croker's edit., including two curious vols. of 'Johnsoniana;' *Memoir* by Walter Scott, Prose Works, vol. iii.; *Edin. Review*, vol. liii. A brief but elaborate and able character of Dr. Johnson has been written by Sir James Mackintosh, and will be found in his *Life*, vol. ii., p. 166.)

JOINT. [ARTICULATION.] Everything that need be here said on Joints is contained in the article referred to.

JOINT STOCK COMPANIES [BANK, BANKER, BANKING; PARTNERSHIP.]

JOINT TENANCY signifies joint ownership of two or more persons in land, or other property, as goods and chattels. It differs from Tenancy in Common [COMMON, TENANCY IN] and Coparcenership [PARCENERS] in the following essentials: joint tenants are severally seised or possessed of the undivided whole of the land or other property in which they have a joint interest, and also of their several shares, which shares are always equal shares, inasmuch as joint tenants take by purchase only, and by a joint title: the estate or interest must be limited to the several persons by the same deed or instrument, and such estate or interest must vest in them at the same time, except (according to the more common opinion) the estate be limited to take effect under the Statute of Uses or by devise, in which cases the contemporaneous vesting of the several parts is not necessary: the whole estate or property will go to the survivors and survivor of the joint tenants, if the jointure continue until such survivorship; which is the important characteristic of a joint tenancy. It is a consequence of the mode in which joint tenants are legally considered to be seised or possessed, and of the right to the whole which accrues to the survivors and survivor, if no separation of the joint tenancy has been made before such survivorship takes place—that they cannot grant, or bargain and sell, or surrender or devise to each other; they cannot exchange with each other, nor can one make a feoffment to another. But any joint tenant may transfer his interest to any one of his companions by release, or rather he can by such instrument put an end to his interest; and any joint tenant may convey his share to a stranger by grant; or he may compel his companions to make a partition, by statute. Every person to whom the interest of a joint tenant is transferred becomes, as to such share, a tenant in common with the remaining joint tenants.

A joint tenant cannot dispose of either the whole or the part of the property in which he is jointly interested consistently with the proper notion of a joint tenancy, by a will made during the continuance of the joint tenancy, even though he should happen to be the survivor; because until he has survived he has nothing to dispose of by will. But by severing the joint tenancy he acquires the power of disposing of his share by will. By a recent act (1 Vict., c. 26), a person may by a will, made according to the provi-

sions of that act, dispose of all real and personal estate to which he shall have a legal or equitable title at the time of his death, and which, if not disposed of by will, would go to his heir, or the heir of his ancestor, or to his personal representatives. But this act gives no power of disposal over the unsevered interest of a joint tenant.

As to the written instruments and words by which a joint tenancy may be created, and the various rights and remedies which belong to a joint tenant, it is not necessary to dwell at any length here. The discussion of them belongs to special treatises on law. As an example of words which would create a joint tenancy, we may take the case of a feoffment to two or more persons and their heirs, which would make the feoffees joint tenants in fee simple, so that the survivors would always succeed, and the last survivor would take the whole in fee, unless any one of the joint tenants had in his lifetime conveyed his share. And generally, when there is a gift of real or personal estate to several persons, and nothing more is said, these words make them joint tenants, even in the case of pecuniary legacies and residuary bequests. To create a tenancy in common, it is not necessary, either in a deed or will, to declare that the parties to whom the gift or devise is made shall take it as tenants in common, and not as joint tenants. Any words which undoubtedly convey this meaning are sufficient for the purpose; but less exact or definite words are required for this purpose in a will than in a deed. Where an estate is given to two persons and the heirs of their bodies, if the two persons are such as cannot have common heirs of their bodies (as two men or two women, or a man and a woman who cannot legally intermarry), then such persons are joint tenants for life, but have separate inheritances, or are tenants in common in remainder in tail. But if the gift be to a man and his wife and the heirs of their bodies, or to a man and woman who may marry and the heirs of their bodies, the parties are joint tenants of the inheritance; and if they be husband and wife they take by intireties. The tenancy by intireties is a consequence of the legal unity of husband and wife. Such tenancy exists when real estate is limited by deed or will to husband and wife jointly during their marriage for an estate of inheritance or freehold: the husband and wife possess the lands intirely as one individual; on the death of either of them they go to the survivor, and there is no power of alienation or forfeiture of either alone which can prejudice the right of the other.

Partners in trade are joint tenants of the partnership stock which is of a moveable kind, but on the death of a partner his personal representatives become tenants in common in equity, with the surviving partners; and it was at one time considered that they acquired a legal tenancy in common, with the survivor. In equity there is no survivorship in lands which partners have held for the purposes of trade.

If money is jointly advanced by two or more persons on a mortgage security, there is in equity no benefit of survivorship among them.

A joint tenant, like a tenant in common, cannot maintain an action of trover against his companion for goods which are in his companion's possession; for according to the English doctrine of possession, possession by one joint tenant, tenant in common, or parcener, is generally the possession of all. The doctrine of possession by joint tenants, tenants in common, and parceners, is materially altered as to lands and rents by 3 and 4 Will. IV., c. 27, sec. 12, and in another case by sec. 13.

JOINTURE. This legal term was originally used to denote the interest of joint tenants, which interest was called an estate *in jointure*. Before the statute of 27 Henry VIII., c. 10 (of Uses), lands conveyed to uses were not subject to dower; and as such conveyances were frequent, it became usual to stipulate, upon a treaty for a marriage, that the intended husband should convey an adequate portion of his lands to the use of himself and wife *in jointure*, i.e. as joint tenants for their lives, whereby a provision would be secured to the wife, if she survived, commensurate in point of duration with the dower which the common law would have given her, if the system of uses had remained unknown. When the Statute of Uses was passed for transferring the legal estate to the *cestui que use*, it was considered unreasonable that wives should by means of the destruction of uses be entitled to claim dower in their husbands' lands, and should at the same time enjoy a provision made for them in consideration that they were not so entitled. The sixth section of this statute therefore provided that women having provisions in the nature of jointures should not be entitled to claim dower of the residue of their husbands' lands. [DOWER.]

An estate limited to a woman must, in order to be deemed a good jointure and a bar to dower under this statute, commence and take effect in possession or in profit immediately on the death of the husband. It must also be for the life of the wife, or for some greater estate. It must be in satisfaction of the whole dower, and not of a part only. It must be made before the marriage; for by the ninth section, if the jointure be made during the marriage, the wife is at liberty after the death of her husband to refuse the jointure and demand her dower. If however the widow once accept such jointure, she is perpetually bound, even though the estate in jointure created during the marriage be made subject to a condition, and is in that respect less beneficial than dower.

A woman, though under age at the time of her marriage, is bound by an antenuptial jointure, inasmuch as the bar of dower arising out of the limitation of a jointure is not a matter of contract (by which minors are not bound), but proceeds upon the ground of the substitution of a new provision made by the husband, or on his behalf, under the authority of an act of parliament. It was formerly considered that the estate must be directly limited to the wife herself, and not conveyed to others in trust for her; but it is now settled that a trust estate is a good equitable jointure in bar of dower.

Where an estate tail is limited to a woman for her jointure, she is restricted from alienation or discontinuance by 11 Henry VII., c. 20, and 32 Henry VIII., c. 36; on the other hand, if she be lawfully evicted from the whole or part of the jointure lands, she will be entitled to be endowed of the residue of the lands of which, but for such jointure, she would have been dowable, to the value of the lands of which she has been deprived by such eviction.

In consequence of the practical inconveniences attending a limitation of land by way of jointure, it has become usual to create a rent-charge (*i.e.* an annuity charged upon land with a power of distress) for the life of the wife, with the power of distress, and also a power of entry, that is, the right of entering upon the land charged and retaining the possession until the annuity is paid, and further protected by a demise of the land to a trustee for a term of years. Such annuity ought in strictness to be charged upon the land which would otherwise be liable to dower, or upon some part of it.

This arrangement is equally beneficial to the widow and to the heir or devisee of the husband. A more certain income is provided for the widow, and the heir or devisee may enter into the immediate possession and take upon himself the management of the whole estate. This substituted provision by way of annuity is frequently called the wife's jointure. (*Co.-Litt.* and Hargrave's *Notes;* Cruise's *Dig.;* Bacon's *Abr.*)

JOINVILLE, JEAN, SIRE or LORD DE, born of a noble family of Champagne, was brought up in the court of Thibaut, king of Navarre and count of Champagne, then one of the most polished courts in Europe. Joinville followed Louis IX. in his first crusade in 1248 with a body of several hundred armed men, which he raised among his tenants; and he was present at the taking of Damiata, and at the disastrous campaign of Massoura, in which Louis and most of his army, with Joinville among the rest, were taken prisoners. Joinville narrowly escaped being killed by the Egyptians; but the ransom being paid, he followed the king to Acre, and was present at the war which was carried on in Palestine, until he returned to France with Louis in 1254. Being a great favourite with the king, and almost constantly near his person during the six years of that crusade, his narrative of that period, written in a simple unpretending style, is extremely interesting. It is entitled 'Histoire de St. Louis, IX. du nom, Roi de France, par Jehan Sire de Joinville,' and has been often republished. One of the best editions is that by Ducange, fol., 1668, with useful notes and learned dissertations. It has been translated into English by T. Jones, 2 vols. 4to., 1807. The character of Joinville, a favourable specimen of a feudal lord in that, the golden age of chivalry, valiant, gay, witty, generous, shrewd, and yet at times careless through vivacity of temper, somewhat worldly and proud of his rank, but withal good-natured and sociable, forms a happy contrast with the piety, auste-

rity, and simplicity of Louis, who however esteemed and loved Joinville for his sincerity and abilities, as much as Joinville cherished Louis's honesty and goodness of heart, of which he gives numerous and affecting proofs in his narrative. Joinville, after his return to his native domain, did not forsake the king, but frequently repaired to his court, and continued to enjoy Louis's confidence. When Louis, in 1269, set out on his second expedition, in which he died at Tunis, he invited Joinville to join him, but he excused himself. Joinville kept away from the corrupt court of Philip le Bel, but afterwards he is said to have joined the army which Louis X. collected at Arras against the Flemish. He died not long after; but the precise epoch of his death is not known. Joinville and his predecessor Villehardouin are among the oldest of the French chroniclers who wrote in the vernacular tongue.

JOLIBA. [Quorra.]

JOMELLI, NICOLO, one of the few celebrated composers of the early part of the last century, whose works justify the encomiums bestowed on them, was born in 1714, at Aversa, according to Mattei—at Avellino, says Burney—both places being near Naples. He was initiated in music by the Canon Muzzillo, and afterwards studied at one of the Neapolitan conservatories, first under Feo, then as the pupil of Leo, confessing himself chiefly indebted to the latter for having inspired him with a true feeling for the art. Subsequently however, when he turned his attention to sacred music, he derived considerable improvement in the more elaborate branches of composition by his intercourse with the learned Padre Martini.

Jomelli produced his first opera at Naples, being then only twenty-three years of age, and so speedily acquired fame, that in 1740 he was summoned to Rome, where he composed two operas, and was warmly patronized by the Cardinal Duke of York. Next year he proceeded to Bologna, and brought out his 'Ezio.' He then returned to the papal capital, and produced one of his finest works, 'Didone.' This led to his being invited to Venice, at that time the great theatre for the display of musical excellence, where his 'Merope' for the *Teatro Fenice*, and a 'Laudate' for the church of Santo Marco, well sustained his reputation. The failure of his 'Armida,' in the following year, at Rome, determined him to visit Germany, and at Vienna he formed an acquaintance with Metastasio, which ripened into a friendship of the closest kind, that death only terminated. To the enlightened conversation and judicious criticisms of the Imperial poet he always confessed his obligations, and to which he ascribed much of the success of his later productions. He set the 'Achille in Sciro,' and got up afresh the 'Didone,' of his illustrious friend, both of which were received by the Germans with enthusiasm.

Metastasio, speaking of Jomelli, in several letters, says, 'He is of a spherical figure, pacific disposition, with an engaging countenance, most pleasing manners, and excellent morals. . . . . He is the best composer for words of whom I have any knowledge. . . . . If ever you should see him, you will be attached to him; he is certainly the most amiable *gourmand* that ever existed.'

At Vienna Jomelli remained two years, where he devoted no inconsiderable portion of his time to the beautiful and accomplished empress Maria Theresa, to whom he gave instructions in music. He was afterwards recalled to Rome, and there produced several operas, also his famous oratorio 'La Passione.' The duke of Würtemberg now prevailed on him to visit Stuttgard, in which city he resided nearly twenty years, and composed an incredible number of Italian operas, most of them however now forgotten; but his 'Missa pro Defunctis,' or 'Requiem,' there produced, will always be known and remain as a monument of his genius. When the duke of Würtemberg was obliged to reduce his establishment, Jomelli went to Naples, where the ill success of two new operas operated so powerfully on his sensitive mind, that an attack of paralysis was the consequence. From this however he sufficiently recovered to compose a Cantata and a 'Miserere,' the latter being by many considered the finest of his works. He died at Naples, in 1774.

Jomelli has been not unaptly called the 'Glück of Italy.' He possessed the deep feeling and vigour that characterized the German composer, and is nearly as rich in accompaniments. Indeed in his admirable, his marvellously affecting scena, 'Berenice, ove sei?' in the serious opera of 'Lucio Vero,' he not only left at an unmeasurable distance all former and contemporary composers, but gave birth to a work which has never yet been surpassed, if ever equalled, and which must transmit his name to posterity, so long as a taste for what very nearly approaches the sublime in music shall exist. We hardly need mention his 'Chaconne,' it is familiar to all; and though not of so high an order of composition as some of the above-named works, yet its great and long-continued popularity is an incontestable proof of its originality and other sterling merits.

JONAH (יוֹנָה, Ἰωνᾶς), was one of the twelve minor Hebrew prophets. He is mentioned in 2 *Kings*, xiv. 25, where we are told that Jeroboam II. 'restored the coast of Israel from the entering of Hamath unto the Sea of the plain, according to the word of the Lord God of Israel, which he spake by the hand of his servant Jonah, the son of Amittai, the prophet, which was of Gath-hepher,' or Gittah-hepher (*Joshua*, xix. 13), a city near the eastern boundary of the tribe of Zebulun, which formed a part of the kingdom of Israel, and afterwards of Galilee. From this passage most critics have supposed that Jonah lived under Jeroboam II., who reigned from 823 to 782 B.C. Bishop Lloyd places him near the close of Jehu's reign, or the beginning of that of Jehoahaz. The book of Jonah, with the exception of the highly poetical prayer in chap. iii., is entirely narrative. It may be divided into two parts. The first (chaps. i. and ii.) relates the attempt of Jonah to evade God's command to preach to the people of Nineveh by fleeing to Joppa, and there embarking in a ship sailing for Tarshish; his being thrown into the sea and swallowed by a fish, in the belly of which he remained three days and three nights; and his deliverance from the fish, which at the command of the Lord vomited him out upon the dry land. The second part gives an account of his second commission to Nineveh, where the king and people repented at his preaching (chap. iii.); his anger because God, upon the people's repentance, did not execute the judgments which the prophet had predicted, and the striking reproof which Jonah received (chap. iv.). The history of Jonah is referred to in several passages of the New Testament (*Matt.* xii. 39-41; xvi. 4; *Luke*, xi. 29, 30, 32), from which it appears improbable that the book of Jonah is to be considered merely a parabolic story, as some have supposed. The canonical authority of the book is generally admitted.

Bochart supposes that the fish which swallowed Jonah was a species of shark (Bocharti *Opera*, tom. iii., p. 742), and Townsend endeavours to identify it with the idol-fish worshipped at Ascalon under the name Derceto.

(The *Introductions* of Horne and Jahn; Calmet's *Dictionary*; Townsend's *Old Testament arranged in Chronological Order*; Rosenmüller's *Scholia*; and list of commentators in Watt's *Bibliotheca Britannica*.)

JONATHAN APPHUS was the youngest brother of Judas Maccabæus, on whose death he was chosen commander of the Jewish forces. After carrying on the war with some success for a few years, he made peace with Bacchides, the general of Demetrius Soter. At the commencement of Alexander's insurrection [Alexander Balas], Jonathan's alliance was warmly courted both by Demetrius and by Alexander. He joined the latter, by whom he was appointed high-priest (B.C. 153). He continued in great favour with Alexander during that king's life, and defeated Apollonius, the governor of Cœle-Syria, who had espoused the cause of Demetrius Nicator. He also laid siege to the Syrian garrison in the castle on Mount Zion. On the accession of Demetrius Nicator, Jonathan succeeded in obtaining the confirmation of his power; but, disgusted by the faithless treatment he afterwards received from Demetrius, he joined the insurrection of Trypho in favour of Antiochus Theos, whose cause he supported with great success. He also confirmed the alliance made by Judas with the Romans. Trypho had put Antiochus on the throne with the purpose of afterwards usurping it himself. Dreading the powerful opposition of Jonathan, he took him by treachery and put him to death, in B.C. 144.

(1 *Maccabees*, chaps. ix.-xii.; Josephus, *Antiquities of the Jews*, book xiii., chaps. i.-vi; Jahn's *Hebrew Commonwealth*, vol. i.)

JONES, INIGO, who has been styled the English Palladio, and who forms an epoch in the history of architecture in this country, was born in the neighbourhood of St. Paul's in London, where his father was a respectable cloth-

worker. Of his youth and education very little is known,—perhaps quite as much as was to be known,—except that by his talent for drawing he attracted the notice of William earl of Pembroke, by whom he was sent abroad, where he spent three or four years studying with his pencil, measuring and examining various remains of antiquity, as well as modern buildings. At that period such task required much greater application and diligence than at present, when almost every ancient building has been shown in engravings, and when the student has been previously familiarised at home with specimens of almost every style, including those of edifices avowedly Italian in their design. Jones, on the contrary, found himself in an entirely new world of art, for the ancient orders were then utterly unknown in England, nor were the Italian orders known, except as exhibited in diminutive columns, pilasters, entablatures, and pediments, applied merely as adscititious ornaments patched upon a degenerate Tudor style. So far the times were eminently propitious to Jones, nothing more being required than for him to transplant the full-grown Italian style, as he found it in the works of Palladio and that school, in order at once to obtain the celebrity of an originator. It was not however until many years after his first visit to Italy that he fully adopted the 'classic' taste.

About the year 1604 he was invited from Italy to Denmark by Christian IV., for whom he is said to have designed part of the buildings of the royal château of Frederiksborg, and also the palace of Rosenborg. Fortunately this is doubtful, there being nothing in the architecture of either of these that would reflect any credit on the taste of our English Palladio. Yet, whether the patronage of the Danish monarch did much for Jones or not, in itself, it promoted his interest at the English court, Christian's sister being the queen of James I. Inigo returned to England in 1605, and was immediately employed at court in devising the machinery and decorations of the costly masques and pageants then in vogue. He was appointed architect to the queen and to Prince Henry. None of his best works belong to this period, for it was not till after his second return from Italy, which he again visited in 1612, on the death of the prince, that he emancipated himself from the mesquin style that had succeeded the downfal of Tudor architecture. Without this second residence in Italy he might have designed a palace for Whitehall quite as extensive as the one he actually made, but it would, no doubt, have been very different in style. On his return he was appointed to the surveyorship-general of the royal buildings, and commenced his plans for that just mentioned. Soon after the only portion ever built of it, namely, the Banqueting House, was completed, he engaged in a task of a very different nature, that of ascertaining the origin and purpose of Stonehenge; and notwithstanding that its rude amorphous blocks—from which no lessons were to be derived, even in regard to construction—could have no attractions for the eye of a votary of Vitruvius and Palladio, and little to captivate the fancy of him who had displayed his invention in courtly pageants, he appears to have prosecuted his ungrateful researches with application that deserved a far better object. His fancy however enabled him to see much in those barbaric remains that had never existed; but as for the question, he left it, as he found it, a subject for speculation.

After the building at Whitehall, he was engaged upon the back-front of old Somerset House, and in adding a Corinthian portico to the west front of old St. Paul's. Both of them have been greatly extolled, more especially the latter, but neither of them remains; we have however another very celebrated production of Inigo's in the church of St. Paul, Covent Garden, in regard to which Quatremère de Quincy, though by no means unfavourable to him, says the most remarkable thing about it is the reputation it enjoys. York Stairs, Ashburnham House, Westminster, a house originally built for the Earl of Lindesay, on the west side of Lincoln's Inn Fields, and Surgeon's Hall, yet remain among his works in the metropolis; and when we say that the last-mentioned has been asserted by some to have been one of his best, no very flattering notion is conveyed of the taste of his admirers. In fact the Banqueting House is almost the only specimen that accounts for his reputation, and even that we suspect is now more praised as a matter of course, than really admired. The designs for the palace of Whitehall, together with many others by Jones, were published in a folio volume by Kent. To give a list of all the buildings attributed to him, or even of the principal ones in addition to those mentioned, would occupy a considerable space. He died in June, 1653, at the age of eighty.

JONES, SIR WILLIAM, was born in London, September the 28th, 1746. William Jones, his father, who was a mathematician of some eminence, was born in 1680, and died in 1749. He was the author of 'A New Compendium of Navigation,' 8vo., London, 1702; 'Synopsis Palmariorum Matheseos, or a New Introduction to the Mathematics,' 8vo., London, 1706; 'Analysis per Quantitatum Series, Fluxiones, ac Differentias,' &c., 4to., London, 1711; besides some papers in the 'Philosophical Transactions.'

William Jones having died when his son was only three years of age, the care of the child's education devolved upon his mother, who appears to have been a sensible and intelligent woman. Jones was remarkable in his early years for his progress in learning. At the age of seven he was sent to the grammar-school at Harrow, and though his classical studies were suspended for a twelvemonth when he was nine years old, in consequence of an accident which kept him from the school, he surpassed almost all his schoolfellows in learning; and so high an opinion had Dr. Thackeray, at that time head-master of the school, formed of the talents of his pupil, that he used to say that 'if Jones were left naked and friendless on Salisbury Plain, he would nevertheless find the road to fame and riches.' Dr. Thackeray was succeeded by Dr. Sumner, who had an equally high opinion of the abilities of Jones; he has been known to declare 'that Jones knew more Greek than himself, and was a greater proficient in the idiom of that language.' During the last two years of his residence at Harrow Jones did not confine himself to the study of the classical writers; he learned the Arabic characters, and made some progress in Hebrew. He devoted a considerable part of his time to composition in Latin, Greek, and English; some of his juvenile pieces have been printed in the fragment of a work which he began at school, and entitled 'Limon,' in imitation of a lost work of Cicero. During the vacations he studied the French and Italian languages.

In 1764, at the age of seventeen, he entered at University College, Oxford, where he continued to prosecute his studies with the greatest diligence. He especially directed his attention to the study of Arabic and Persian; and employed his vacations in reading the best authors in Italian, Spanish, and Portuguese. In 1765 he left Oxford, and went to reside in the family of Earl Spencer in order to superintend the education of Lord Althorp. In 1770 he resigned this situation with the intention of going to the bar, but he did not immediately commence his legal studies. During the five years that he resided in Earl Spencer's family he made great acquirements in Oriental literature, and obtained by his publications the reputation of being one of the first Oriental scholars of his age. In 1768 he was requested by the king of Denmark to translate the 'Life of Nadir Shah' from the Persian into French; this translation was published in 1770, with a treatise on Oriental poetry, also written in French, in which he has translated several of the Odes of Hafiz into French verse. In the following year he published a grammar of the Persian language, which is the best grammar of that language that has yet appeared. It has been republished of late years with many additions and improvements by Professor Lee, of Cambridge. In his twenty-first year he began his 'Commentaries on Asiatic Poetry' in imitation of Bishop Lowth's 'Prelections on the Sacred Poetry of the Hebrews.' This work, which was written in Latin, and was published in 1774 under the title of 'Poeseos Asiaticæ Commentariorum Libri Sex,' contains many excellent remarks on Oriental poetry in general and translations from the most celebrated Hebrew, Arabic, Persian, and Turkish poets. It was republished by Eichhorn, at Leipzig, 1776. He also began, during his residence with Earl Spencer, a Dictionary of the Persian language, in which the principal words were illustrated by quotations from the most celebrated Persian authors. In 1771 he replied anonymously in French to Anquetil du Perron, who had attacked the University of Oxford and some of its learned members in his introduction to the 'Zend-Avesta.' This reply was written in such good French that Biorn Sthal, a Swedish Orientalist, says, 'that he had known many Frenchmen so far mistaken in the writer as to ascribe it to some *bel-esprit* of Paris.' For some further remarks on this subject the reader may consult the article ANQUETIL. In 1772 Mr. Jones published a small volume of poems

consisting chiefly of translations from the Asiatic languages.

In 1774 Mr. Jones was called to the bar. Feeling the importance of devoting his whole time to his legal studies, he left all his Oriental books and MSS. at Oxford, and diligently attended the courts of common law. During this time he wrote an essay on the law of bailments, which has since been re-published. The work is characterized by Jones's usual perspicuity and ease of expression; so far as concerns the arrangement and matter, we are not aware that it contains anything original, and it is sufficient to read it to be convinced that the author had not a mind adapted to seize with precision the fundamental principles which form the science of law. Jones's extravagant panegyric on Blackstone is sufficient to show in what manner he had studied law.

In 1780 he became a candidate to represent the University of Oxford in parliament, but finding that he had no hope of success in consequence of his opposition to the ministers of the day, and his condemnation of the American war, he withdrew from the contest. His opinions on political subjects are given in his 'Enquiry into the Legal Mode of Suppressing Riots,' in his 'Speech to the Assembled Inhabitants of Middlesex,' &c., in his 'Plan of a National Defence,' and in his 'Principles of Government;' which are printed in the eighth volume of his works (8vo. edition). After an interval of six years, when he had acquired great reputation in his profession, he again resumed his Oriental studies, and employed the leisure hours of the winter of 1780-1 in translating some antient poems of the highest repute in Arabia, which are called *Moallakat*, or 'suspended,' because they are hung up in the Temple of Mecca. In 1783 he was appointed, through the influence of Lord Ashburton, a judge in the supreme court of judicature at Fort William in Bengal; on which occasion he was knighted. A few weeks after he married Miss Shipley, the eldest daughter of the bishop of St. Asaph.

Sir William Jones arrived at Calcutta at the close of the year; and from this time to that of his death, a period of eleven years, he devoted all his leisure time to the study of Oriental literature. Almost immediately after his arrival he induced those persons who had paid attention to Oriental literature to unite in forming a Society 'for inquiring into the history and antiquities, the arts, sciences, and literature of Asia.' To the 'Asiatic Researches,' which were published by this Society, of which Sir William Jones was the first president, Oriental scholars in Europe are indebted for much of their knowledge of the literature and antiquities of the Hindus. Sir William Jones contributed the following treatises to the first four volumes of the 'Asiatic Researches:' eleven 'Anniversary Discourses' on the different nations of Asia, &c.; 'A Dissertation on the Orthography of Asiatic Words in Roman Letters;' 'On the Gods of Greece, Italy, and India;' 'On the Chronology of the Hindus;' 'On the Antiquity of the Indian Zodiac;' 'On the Second Classical Book of the Chinese;' 'On the Musical Modes of the Hindus;' 'On the Mystical Poetry of the Persians and Hindus,' containing a translation of the Gîtagovinda by Jayadêva; 'On the Indian Game of Chess;' 'The Design of a Treatise on the Plants of India;' and many other treatises of less importance.

The study of Sanskrit principally engaged the attention of Sir William Jones during the first three or four years of his residence in Bengal. When he had attained sufficient proficiency in this language he proposed to the government to publish a copious digest of Hindu and Mohammedan law; he offered to superintend the compilation, and to translate it. This offer was willingly accepted, and Sir William Jones laboured for many years on the work. It was unfinished at the time of his death; but has since been completed under the superintendence of Mr. Colebrooke. The laws of Manu, on which the whole system of Hindu jurisprudence is founded, were translated by Sir William Jones, and published separately in 1794. Those who are interested in Hindu literature are also indebted to Sir William Jones for a translation of Sacontalâ, a dramatic poem by Câlidâsa, which appeared for the first time at Calcutta in 1789; and also for a translation of the Hitopadêsa, which appears to have been the original of the celebrated collection of Persian fables known under the name of Pilpay or Bidpai. [BIDPAI.] But while he was indefatigable in the pursuit of literature, he never neglected his duties as a judge; and 'the inflexible integrity,' remarks Lord Teignmouth, 'with which he discharged the solemn duty of this station, will long be remembered in Calcutta, both by Europeans and natives.' He died at Calcutta, on the 27th of April, 1794, after a few days' illness.

A mere catalogue of the writings of Sir William Jones would show the extent and variety of his knowledge. He had a wonderful facility for the acquisition of languages; his knowledge of Latin and Greek was extensive, though not profound; his acquaintance with Arabic, Persian, and Sanskrit has seldom been equalled, and scarcely, if ever, surpassed by any European; he was familiar with Turkish and Hebrew; and had learned enough of the Chinese to enable him to translate an ode of Confucius. He was also well acquainted with most of the modern languages of Europe,—French, Italian, Spanish, Portuguese, and German; and had studied less critically numerous other languages. His knowledge of science was not so extensive or accurate: he had however made some progress in mathematics; was well acquainted with chemistry; and had studied botany during the latter years of his life with the greatest diligence. But though the attainments of Sir William Jones were so various and extensive, he does not appear to have possessed any originality. He neither discovered new truths nor placed old ones in a new light. He possessed neither the power of analyzing nor of combining and constructing. For language, as a science, he did nothing: he only collected materials for others. His writings on Oriental literature are interesting and instructive; but neither they nor any of his other works are distinguished by any originality of thought or power of expression; his style is weak, and his judgment frequently defective. His literary attainments were certainly such as few men, perhaps none, have ever made; yet with every disposition to admire and honour him for what he has done, we cannot assign him a high intellectual rank. Doubtless he weakened his powers by diffusing them over so large a surface, instead of concentrating them on a few objects. His personal character must always command our respect; he was an indefatigable scholar, an affectionate son, a faithful friend, a useful citizen, and an upright judge.

In addition to the works which have been already mentioned, Sir William Jones published a translation of Isæus; and also translations of two Mohammedan law tracts 'On the Law of Inheritance, and of Succession to Property of Intestates;' 'Tales and Fables by Nizami;' 'Two Hymns to Pracriti;' and 'Extracts from the Vedas.'

A complete edition of the works of Sir William Jones was published in 6 volumes, 4to., 1799, and in 13 volumes, 8vo., 1807, with his life by Lord Teignmouth.

JONES, JOHN PAUL, was born 6th July, 1747, according to the 'Encyclopædia Americana' at Arbingland (Arbigland?), according to other accounts in the parish of Kirkbean, in Kirkcudbright, Scotland. The name of his father, who was a gardener, was Paul; the addition of Jones was assumed by the son after he grew up in life. He went to sea at the age of twelve, and after making many voyages to America and other parts, was in 1768 made captain and supercargo of a vessel which he had shortly before brought safe into port, having, at the request of those on board, when he was sailing in her as a passenger, taken the command on the death of the captain and mate. Having in a few years made a good deal of money, he settled in Virginia in 1773, on a property which fell to him by the death of an elder brother, who had been for some years established there as a planter. After the declaration of their independence by the colonies, he offered his services in the war against his native country, in which he soon greatly distinguished himself. On being appointed to the command of the Providence, he cruised among the West India Islands, and, as it is stated, made sixteen prizes in little more than six weeks. In May, 1777, he proceeded, by order of the Congress, to France, where he was immediately appointed, by Franklin and his brother commissioners, to the command of the Ranger, in which the next year he sailed upon a cruise to the coasts of Britain, and, after making a descent by night at Whitehaven, where he spiked the guns of the forts and set fire to one or two vessels, besides plundering the house of the earl of Selkirk on the opposite coast of Scotland, returned to Brest with 200 prisoners, and the boast that he had for some time kept the north-western coast of England and southern coast of Scotland in a state of alarm with his single ship. In the autumn of 1779 he set sail again on a similar expedition

for the eastern coasts of England and Scotland, in which his success and the terror he created were still greater than on the former occasion. Among other exploits, having encountered the Baltic fleet, he attacked its convoys, the Serapis frigate and the Countess of Scarborough, off Flamborough Head, on the 23rd of September, and, after a sanguinary engagement, succeeded in capturing the first-mentioned of these vessels. For this achievement he was, on his return to Paris, presented by Louis XVI. with a richly ornamented sword, bearing a flattering inscription, was invested with the military order of Merit, and received in every way the most distinguished reception both from the government, the court, and in general society. At this time it seems he wrote verses, and evinced a violent ambition to make a figure in the fashionable world; he is described by an English lady then resident at Paris as 'a smart little man of thirty-six, who speaks but little French, and appears to be an extraordinary genius—a poet as well as a hero.' On his return to America, in February, 1781, a gold medal was voted to him by Congress. He then served till the peace under the French admiral D'Estaing, after which he proceeded to Paris with the appointment of agent for prize-money. Some years afterwards he entered the Russian service with the rank of rear-admiral; but disputes in which he became involved with the Russian naval authorities soon compelled him to retire, on which he returned once more to Paris, where he lived till his death, 18th July, 1792, having, according to his American biographer, gradually sunk into poverty and neglect before he was attacked by disease. 'Jones,' concludes the writer in the 'Encyclopædia Americana,' was a man of signal talent and courage; he conducted all his operations with the most daring boldness combined with the keenest sagacity in calculating the chances of success and the consequences of defeat. He was however of an irritable impetuous disposition, which rendered him impatient of the authority of his superiors, while he was at the same time harsh in the exercise of his own; and he was deficient in that modesty which adorns great qualities and distinguished actions, while it disarms envy and conciliates jealousy. His early education was of a very limited kind. It terminated when he went to sea at the age of twelve; but he supplied its defects by subsequent study, so as to enable himself to write with fluency, strength, and clearness, and to sustain his part respectably in the polished society into which he was thrown. . . . . His memorials, correspondence, &c., are quite voluminous.' A biographical memoir of Jones, by Mr. J. S. Sherburne, appeared, it seems, at Washington in 1825. We may add that in Scotland his name, and the impression of the dread he occasioned, are still alive in the popular memory, and universally familiar to old and young. Some account of his traditionary reputation may be found in a singular book entitled 'The Scottish Gallovidian Encyclopædia,' by John Mactaggart, 8vo., London, 1824 (pp 373-376). According to this writer, who tells us that he has had his information about Jones 'from the lips of many who personally knew him, and all about his singular ways,' he was 'a short thick little fellow, about five feet eight in height, of a dark swarthy complexion.' 'He was,' continues the account, 'a common sailor for several years out of the port of Kirkcudbright, and was allowed to be unmatched on that coast for skill in sea matters.'

JONE'SIA, a genus of plants of the tribe Cassieæ, and of the natural family of Leguminosæ, which was named by Dr. Roxburgh in honour of Sir William Jones, who, in the midst of his numerous other avocations, found time to pay attention to Indian plants. The species are few in number, and indigenous in the islands of the Malayan Archipelago, as well as on the eastern frontier of Bengal, that is, in Silhet and lower Asam. They form trees which are highly ornamental from their handsome, shining, abruptly pinnate leaves, and from the showy nature of their crowded racemes of flowers. *J. Asoca*, the best known species, is often referred to by Hindu poets by the name which has been adopted by botanists to distinguish it as a species. Dr. Roxburgh says, and we can in a great measure coincide with him in opinion, 'When this tree is in full blossom, I do not think the whole vegetable kingdom affords a more beautiful object.' (*Fl. Ind.*, ii., p. 220.)

JONSON, BENJAMIN, was born at Westminster in the year 1574, and educated at Westminster school. While he was there his mother married a second husband, by trade a bricklayer, and when Jonson became of sufficient age to be employed, he worked at his father-in-law's business. According to Dr. Fuller, he soon left it and went to the University of Cambridge, but was obliged from necessitous circumstances speedily to return, and was employed in the new structure of Lincoln's Inn. According to Mr Wood, some gentlemen who saw him working with his father took compassion on him, and he was sent by Camden to Sir Walter Raleigh, whose son he attended on his travels on the Continent. On his return he went to Cambridge. According to a third account, before going to Cambridge he served as a soldier in the Low Countries, and the statement seems to be confirmed by one of his own epigrams. The fact is, that the early part of his life is quite uncertain, though it is well known that on leaving Cambridge he betook himself to the stage, where he proved but an indifferent actor and at first an indifferent author. While a retainer to the stage he had the misfortune to kill a man in a duel, and was committed to prison, where the visits of a Catholic priest converted him to the Church of Rome. Twelve years afterwards he returned to the Church of England.

It was in the year 1598 that his fame rose by the production of the comedy of 'Every Man in his Humour,' at the Globe Theatre, and from this time he adopted the practice of writing a play a year, for several successive years. 'Every Man out of his Humour' was acted at the Globe; 'Cynthia's Revels,' which the author has called not a comedy, but a comical satire, was performed by the children of Queen Elizabeth's chapel, as was also another comical satire, 'The Poetaster.' This last piece was occasioned by a quarrel with Decker, who is satirized under the name of Crispinus. Decker retaliated by a play entitled 'Satiromastix,' in which Jonson appears under the title of Young Horace. Jonson's tragedy of 'Sejanus' was produced in 1603, and his noble play of 'Volpone' appeared two years afterwards. About this time he was committed to prison with Chapman and Marston, the three poets having written the comedy of 'Eastward-hoe' (printed in Dodsley's collection), which contained some reflections on the Scots. They were in danger of losing their ears and noses, but were soon pardoned and released. It is said that Jonson's mother intended to poison herself, if the punishment had been inflicted. Being much occupied with court masques, in the writing of which he had acquired great celebrity, Jonson did not produce another play (in the strict sense of the word) till 1609, when his 'Epicœne' was acted, which is regarded by Dryden as a perfect comedy. 'The Alchemist' appeared in 1610, and though more deservedly reckoned one of the best of his works, was no great favourite with the public. Its ill success is ascribed by some to a party raised against him. Dryden has supposed that the 'Alchemist' was written in imitation of a piece called 'Albumazar' (in Dodsley's collection), but the style and general conduct of the two pieces are so very different that there scarcely seems a reason for supposing any imitation other than the mere circumstance that both plays satirize pretended adepts. It is a curious fact that the fine play of 'Albumazar' likewise met with no success. In 1611 appeared the tragedy of 'Catiline,' in which the long speeches translated from Cicero and Sallust called forth animadversions, which were disregarded by the author, as he gloried in plagiarisms which served to exhibit his learning. After the production of 'Bartholomew Fair' in 1614, and 'The Devil is an Ass' in 1616, he published his works in folio, and soon after retired to live in Christ Church, Oxford, whither he had been invited by several members. In 1619 he became poet laureate, and received an annual stipend of 100*l.* and a tierce of Spanish wine. The condemnation of 'The New Inn,' which he produced in 1625, nearly disgusted him with the stage, though he afterwards wrote 'The Magnetic Lady' and 'The Tale of a Tub,' which are considered inferior productions. He appears to have suffered much from poverty in the latter part of his life. He died on the 6th August, 1637, and was buried three days afterwards in Westminster Abbey. His monument, inscribed 'O Rare Ben Jonson,' is familiar to every person who has visited the Abbey.

Jonson's plays are well adapted to the perusal of earnest students, who will find in them a mine of sterling though often rugged beauty; but those will be disappointed who look to his works for the amusement of a passing hour. In the first place it requires a suitable education to enable a person to relish his imitations of the classic authors; and in the second, his plays do not so much represent human

character generally, as mankind under the particular circumstances of Jonson's own time, and many local allusions are made which cannot be understood without some knowledge of the manners and customs of the time: but Mr. Gifford's notes in his edition of Jonson are a treasure of this kind of information. The practice of exhibiting the 'humours,' that is, the peculiarities of character, obtained for Jonson the name of the 'humorous' poet, which name must be understood in a sense quite different from that in which it is used at present. The lovers of a more natural school of poetry are seldom admirers of Jonson, who finds his chief readers among those who like to observe the elaboration of dramatic art. Besides his completed dramatic works, Jonson has left two fragments, 'Mortimer's Fall,' which he intended to be a tragedy in the Greek style, and the 'Sad Shepherd,' a dramatic pastoral which is one of the gems of early English literature. He has also left a translation of Horace's 'Art of Poetry,' an 'English Grammar' of some merit, and a few poems, some of which are singularly beautiful. 'Every Man in his Humour' is the only piece that has kept possession of the stage. 'The Alchemist' has been abridged to a farce called 'The Tobacconist.'

JOPPA. [SYRIA.]

JORDAENS, JACOB, born at Antwerp in 1594, was a disciple of Adam van Oort, but was indebted to Rubens for the greater part of his knowledge in the art of painting. He was prevented from visiting Rome by an early marriage with Van Oort's daughter; but he diligently copied the best pictures of the great Italian masters to which he could procure access. His pictures are distinguished by powerful, brilliant, and harmonious colouring, as well as knowledge of chiaroscuro. His composition is rich, his touch free and spirited; but he is deficient in elegance and taste; he copied nature as he found it. He painted with great facility and rapidity, and being also extremely diligent and living to a great age (he died in 1678, aged eighty-four), his works are very numerous: a great many of the churches in the Netherlands have altar-pieces by him, and his pictures are met with in most collections of any eminence.

JORDAN. [SYRIA.]

JORTIN, JOHN, D.D (born 1698, died 1770), was of foreign extraction, his family having left France when Louis XIV. revoked the edict of Henry IV., commonly called the Edict of Nantes, for the protection of his Huguenot subjects. He was himself born in London. He had his grammar education at the Charter House, from whence he passed to Jesus College, Cambridge, of which he became in due time a Fellow.

While living at Cambridge he published a small volume of Latin poems, which are greatly admired, and allowed to possess a high rank among modern Latin verses. His College presented him to a living in Cambridgeshire, but he determined on leaving the country and residing in London, where he soon became an acceptable, or rather, in the better sense of the phrase, an admired and popular preacher. His sermons, many of which are printed, are distinguished for their excellent sense and the originality at once of thought and style. In 1751 he obtained the living of St. Dunstan in the East. His other church preferment was the living of Eastwell in Kent, presented to him by the earl of Winchelsea. This was for the greater part of his life all the preferment he enjoyed; but in 1762, when his friend Dr. Osbaldeston became bishop of London, Jortin was appointed his domestic chaplain, and was presented with a prebend in the church of Saint Paul and the living of Kensington. To these was soon added the archdeaconry of London. He fixed his residence at Kensington, and was buried in the new churchyard of that place.

The critical writings of Dr. Jortin are greatly admired by all who have a taste for curious literature. It is not merely on account of the learning which is displayed in them, and the use which is made of obscurer authors, but there is a terseness in the expression, and a light playful satire in the thoughts, which make them exceedingly entertaining. The first work of this class was published in 1731, and is entitled 'Miscellaneous Observations on Authors, antient and modern.' In 1751 the first volume appeared of his 'Remarks upon Ecclesiastical History;' and in 1758 he published his 'Life of Erasmus.

JORULLO. [MEXICO.]

JOSEPH I., of the house of Austria, emperor of Germany, succeeded his father Leopold I. in 1705. He carried on the war called that 'of the Spanish succession,' which had begun under his father, against Louis XIV. The allied armies under Eugene and Marlborough were prosperous in his reign. The battles of Ramilies, Oudenarde, and Malplaquet, the deliverance of Turin by Prince Eugene, the surrender of Naples to the Austrians, and the permanent footing obtained by the Archduke Charles in Spain, seemed to have nearly decided the question, when Joseph died of the smallpox in April, 1711, leaving his brother Charles, afterwards Charles VI., the last male heir of the house of Habsburg, to conclude the war. Joseph was a good prince; he was learned, and assiduous in the discharge of his duties, humane, and though a sincere Catholic, yet tolerant. He was one of the best of a house fertile in good and wise princes.

JOSEPH II., eldest son of Maria Theresa and of Francis of Lorraine, was elected king of the Romans in 1764, and in the following year, on the death of his father, he became emperor. As long as his mother lived he had little real power, as Maria Theresa retained the administration of her vast territories in her own hands; but on her decease, in 1780, he became possessed of all the hereditary Austrian dominions. Joseph soon displayed considerable ambition mixed with much restlessness: he was however kept in check by France and by Frederic of Prussia. After the latter died, in 1786, Joseph joined Catherine of Russia in a war against Turkey, which his general Laudon carried on with success, taking Belgrade and other fortresses in 1789. But the threatening aspect of affairs in France and Brabant arrested the progress of the Austrian armies, and Joseph himself died in 1790. The character in which Joseph is chiefly viewed is that of a reformer; in many instances a wise one, but in others rash and inconsiderate. He abolished all separate jurisdictions, and divided the Austrian monarchy into thirteen governments subdivided into circles, all under a uniform administration, civil and judicial. He abolished feudal servitudes, and substituted a fixed tax in lieu of corvées, taskworks, tithes, heriots, &c. He issued the edict of toleration, by which all Christians, of whatever denomination, were declared equally citizens, and equally eligible to all offices and dignities. Wherever there was a population of 3000 inhabitants, whether Protestants or Greeks, they were allowed to build a church for themselves, provided they established at the same time a permanent fund for the support of the minister and relief of the poor. The Jews were allowed the exercise of all trades and professions, with access to the public schools and universities. He took away from the clergy the censorship of the press, and gave it to a commission of literary men resident at Vienna. He opened colleges and universities, enlarged those already existing, endowed new professorships, and collected libraries. He encouraged manufactories, but, according to the old system, he placed exorbitant duties on foreign articles. He subjected the monastic fraternities to diocesan jurisdiction; and he suppressed many convents, but he did it harsh manner, without regard to the necessities and feelings of the older inmates, who were turned adrift into the world with only small pensions, and in some cases even without them. He forbade pilgrimages and processions, prohibited the pomp of funeral ceremonies, declared marriage to be a purely civil contract, forbade all papal bulls to be published throughout his dominions without the permission of the government, abolished the privileges of the university of Louvain, and established a new theological seminary in its place. These innovations, in a country so strongly attached to its old institutions and religion as the Belgian provinces were, led to an insurrection, and ultimately to the separation of those fine territories from the Austrian monarchy. His scheme of establishing the German as the universal language throughout his dominions led to a revolt in Hungary, which his more temperate successor Leopold had some difficulty in pacifying. In short, the reforms of Joseph partook both of the good and the evil of that spirit of innovation which has prevailed in Europe ever since his time; for with all his liberality he was perfectly despotic in carrying his measures into effect, without regard to the feelings, prejudices, or interests of individuals. He has been quaintly, but not inappropriately, styled the imperial avant-courier of the French revolution.

JOSEPH, King of Portugal. [PORTUGAL.]

JOSE'PHUS, FLA'VIUS, the celebrated Jewish historian, was born at Jerusalem A.D. 37. His family was one of very distinguished rank; by his mother's side he was de-

scended from the Asmonæan princes; and his father Matthias belonged to the chief sacerdotal family of the first of the twenty-four courses. Josephus was brought up at Jerusalem with his brother Matthias; and, according to his own account, he made such progress in learning that he was frequently consulted at the age of fourteen concerning difficult points in the law. At the age of sixteen he resolved to become acquainted with the opinions of the three principal Jewish sects, namely, those of the Pharisees, Sadducees, and Essenes. He accordingly studied the doctrines of each; but having heard that a celebrated Essene of the name of Banus lived in an ascectic manner in the desert, Josephus joined him in his solitary mode of life, and passed three years in his society. At the age of nineteen he again returned to Jerusalem, and embraced the opinions of the Pharisees. In his twenty-sixth year he sailed to Rome with the view of obtaining the liberation of some priests of his acquaintance, who had been seized by Felix, procurator of Judæa, and sent as captives to Rome. He had the misfortune to be shipwrecked in the Adriatic; but upon arriving at Puteoli, he became acquainted with an actor of the name of Aliturius, through whose means he was introduced to Poppæa, the wife of Nero, who procured the liberation of the priests, and bestowed many presents upon Josephus.

On his return to Jerusalem, Josephus found the greater part of his countrymen preparing for war against the Romans. Being strongly opposed to this measure, he joined himself to that party which was anxious for the preservation of peace. After the defeat of the Roman general Cestius, and the massacre of the Jews in Syria and Alexandria, all hope of peace appears to have been lost; and Josephus accordingly united himself to the war party. Being deputed, together with Joazar and Judas, to defend the province of Galilee, he made vigorous preparations against the Romans, though his plans were constantly thwarted, and his life frequently in danger from his personal and political enemies. On the approach of Vespasian's army in the following year, A.D. 67, Josephus retreated to Jotapata; and after defending the city for forty seven days against the whole Roman army, he was taken prisoner on the capture of the town. But instead of being put to death, as was the fate of all his companions, he was received by Vespasian with distinguished honour, in consequence of his pretending to the character of a prophet, and artfully predicting that Vespasian would shortly succeed Nero in the government of the Roman empire. He was present with Titus at the siege of Jerusalem, and endeavoured to prevail upon his countrymen to submit to the Romans. After Vespasian succeeded to the purple he was treated by Titus with still greater honour than before; but by the Jews he was regarded as a renegade, and by the Roman soldiers was looked upon with suspicion. On the taking of the city, Titus offered to grant him anything he wished. He asked for the sacred books, and the lives of his brother and fifty friends. He received a large estate in Judæa; and upon going to Rome was admitted to the privileges of a Roman citizen by Vespasian, who also gave him an annual pension and apartments in his own house. After the death of Vespasian, he continued to live in Rome in high favour with Titus and Domitian. The time of his death is uncertain; he was certainly alive at the latter end of the first, and probably at the beginning of the second century.

The first work published by Josephus was the history of the 'Jewish War;' it was originally written in the Syro-Chaldaic language for the use of those Jews who lived beyond the Euphrates. He afterwards translated it into Greek for the benefit of the learned Romans. The 'Jewish War' consists of seven books, and gives an account of the history of the Jews from the taking of Jerusalem by Antiochus Epiphanes to the destruction of the city by Titus. Many years afterwards, A.D. 93, Josephus published in Greek his great work on the 'Antiquities of the Jews,' with the view of increasing the reputation of his nation with the Romans, and of refuting the many calumnies in circulation against the Jews, by giving a faithful account of their history and opinions. This work commences, in the same manner as the book of *Genesis*, with the creation of the world; and it gives a consecutive account of Jewish history from the birth of Abraham to the commencement of the war with the Romans. The early part is taken from the books of the Old Testament, with many additions and explanations; some of which were probably genuine Jewish traditions; but the greater part appear to have been only added by the historian, in order to give more importance to his nation, and a greater air of probability to the miraculous occurrences in Jewish history. The 'Antiquities of the Jews' consists of twenty books, and was dedicated to Epaphroditus, a philosopher at Rome.

Josephus also wrote 'Two Books against Apion,' in reply to those Greeks who questioned the truth of the early part of his work on the 'Antiquities of the Jews.' He likewise published an account of his own life in answer to Justus, who had written in Greek an account of the Jewish war, in which he attacked the character of Josephus.

The best editions of Josephus are by Hudson, Oxf., 1720, 2 vols. fol.; Havercamp, Amst., 2 vols. fol; Oberthür, Leip., 3 vols. 8vo., 1782-5; and Richter, Leip., 6 vols. 12mo., 1826-7. The works of Josephus have been frequently translated into most of the modern languages of Europe: the best translations are—in French, by Gillet, Paris, 1756, 4 vols. 4to.; that in Italian, by Angiolini, Verona, 1779, 4 vols. 4to; and in English by Whiston. There are several German translations: one by J. B. Ott, Zürich, 1736; another by J. F. Costa, Tübingen, 1736; and the 'Jewish War,' by J. B. Frise Altona, 1804 5, 2 vols. 8vo.

JOSHUA (יְהוֹשֻׁעַ: in the LXX., Josephus, *Acts*, vii. 45, and *Hebr.* iv. 8, he is called Ἰησοῦς), a book of the Old Testament, so called because it records the exploits of Joshua, the son of Nun, who succeeded Moses in the command of the Israelites. Joshua, whose original name was Hoshea (הוֹשֵׁעַ, *Numb.* xiii. 8, 16), accompanied his countrymen from Egypt, and distinguished himself by his courage and military talents in a war with the Amalekites (*Exod.* xvii. 9 13). He was sent, together with several others, to explore the Promised Land, and was the only one of the spies, with the exception of Caleb, who exhorted his countrymen to invade Canaan (*Numb.*, xiv. 6-9, 38). In consequence of this he received especial marks of favour from God, and was nominated by Moses, on the express order of God, to succeed him in the command of the Israelitish army (*Numb.*, xxvii. 18-23; *Deut.*, iii. 28; xxxi. 23) Joshua led the Israelites over the Jordan, B C. 1451; and in the course of seven years conquered the greater part of Palestine, and assigned a particular part of the country to each of the tribes. He died at the age of 110, and was buried at Timnath-serath, in Mount Ephraim (*Josh.*, xxiv. 29, 30). We learn from Josephus that Joshua commanded the Israelites for twenty-five years (*Antiq.*, v. 1, sec. 29).

The author of the Book of Joshua and the time in which it was written are equally uncertain. Many critics have supposed that it was written by Joshua himself; but the entire book in its present form could not have been written by him, for many parts of the book refer to events which happened after the death of Joshua (*Josh*, iv. 9; xv. 13-19, compared with *Judg.*, i 10 15; *Josh*, xvi 10, with *Judg.*, i. 29; *Josh.*, xix 47, with *Judg.*, xviii. 29). Many critics suppose the book to have been written by Samuel or Eleazar, whose death is recorded in the last verse of the book: Lightfoot ascribes it to Phinehas, the son of Eleazar, and De Wette to the time of the Babylonish captivity. But at whatever time it may have been written, the author appears to have compiled the greater part, if not the whole, of the work from very antient documents, some of which were probably drawn up by Joshua himself. The survey of the conquered country is expressly said to have been 'described in a book' (*Josh.*, xviii. 9); and Joshua is also said to have written 'in the book of the law of God' the renewal of the covenant between God and the people of Israel (*Josh.*, xxiv 26). The Book of Jasher, which has long since been lost, is quoted in *Joshua* (x. 13) as a work of authority. In *Josh*, v. 1, the author appears to quote the exact words of a document written by a person who was present at the events recorded

The Book of Joshua is a continuation of the Book of Deuteronomy, and gives an account of Jewish history from the death of Moses to that of Joshua. It may be divided into three parts, of which the first contains the history of the conquest of the southern and northern parts of Palestine (chaps. i.-xi.), and a recapitulation of the conquests both of Moses and Joshua (ch. xii.); the second part gives a description of the whole of Palestine (ch. xiii.), and an account of the land which was allotted to Caleb and each of the tribes (chaps. xiv.-xxii); the third part contains an account of the dying address, death, and burial of Joshua (chaps. xxiii., xxiv.)

The canonical authority of this book has never been disputed. In all the MSS. of the Old Testament it immediately follows the Pentateuch.

Many Christian commentators consider Joshua to have been a type of Christ; but this opinion is not supported by any writer of the New Testament.

The Samaritans have two books which bear the name of Joshua. 1. One of these is a chronicle, consisting of forty-seven chapters, of Jewish history from a little before the death of Moses to the time of the Roman emperor Alexander Severus. It appears to have been called the Book of Joshua, because the history of Joshua occupies the greater part of the work (the first thirty-eight or thirty-nine chapters). It is written in the Arabic language, in Samaritan characters. Copies of this work are extremely scarce. The only copy in Europe, as far as we are aware, is in the University Library at Leyden, to which it was left by Joseph Scaliger. 2. The other Book of Joshua, written by one Abul-Phatah, is also a chronicle of events from the beginning of the world to A.H. 898 (A.D. 1492). There is a copy of this work in the Bodleian Library at Oxford. Schnurrer, who also possessed another copy, has given an account of the chronicle in the ninth volume of the 'Repertorium für Bibl. und Morgenl. Litt.'

(The *Introductions* of Eichhorn, Jahn, De Wette, Augusti, and Horne; Rosenmüller's *Scholia;* the best critical works on Joshua are by Masius, *Josuæ Imperatoris Historia illustrata*, Antwerp, 1574; Meyer, *Ueber die Bestandtheile und die Oekonomie des B. Josua*, with a review of the same book in Bertholdt's 'Journal der Theolog. Litt.' vol. ii., pp. 337-366; Herwerden's *Disputatio de Libro Josuæ*, Groning. 1826; Maurer's *Commentar über d. B. Josua*.)

JOUDPORE. [MARWAR.]

JOURNALS OF THE LORDS AND COMMONS. [PARLIAMENT.]

JOVELLA'NOS, GASPER MELCHIOR DE. This patriotic and enlightened writer and statesman, who zealously devoted his talents to the improvement of his countrymen and the defence of their liberties, was born at Gijon in the Asturias, in 1749. Although of noble lineage, being nephew to the duke of Losada, he possessed but a moderate patrimony; accordingly, as soon as he had completed his studies at the universities of Oviedo, Avila, and Alcala, he accepted the appointment of magistrate at Seville. Yet such were his economy and public spirit, that he would have declined the salary if he had not been pressed, and he appropriated a considerable portion of his emoluments to the 'Instituto Asturiano.' In 1778 he was made chief judge of the King's Court at Madrid, in which city he became acquainted with Cabarrus, Campomanes, and other eminent literary characters. He was afterwards removed, upon some futile pretexts, through the machinations of court intrigue, but was again recalled, and raised to the more important office of minister of grace, or home-secretary of state, to retain it however only for a few months, when the influence of the unprincipled Godoy expelled him. He now returned to Gijon, where his cares were directed towards the 'Instituto Asturiano,' which he had succeeded in establishing in 1794; yet he was not allowed to pursue his plans for public instruction long, since in about two years and a half afterwards he was arrested, and sent as prisoner to Majorca, where he was confined in the castle of Bellver. Even during this period, which continued upwards of seven years, he prosecuted his studies as diligently as circumstances would permit, and commenced a 'Flora Bellverica,' and collected materials for a history of the island. At length, after the downfal of Godoy, he was permitted to return by Ferdinand VII., and on that sovereign's abdication, was chosen member of the central junta. When that body was dissolved, the illustrious veteran returned to Gijon, to be shortly after driven from his home when the French invaded Asturias, in 1812. Within two months death liberated him from all his persecutors.

As a writer on subjects of political economy and legislation, Jovellanos stands foremost among his countrymen; but besides his productions of that class, he wrote numerous others, among which may be mentioned his celebrated 'Pan y Toros,' the tragedy of 'Pelayo,' the comedy of 'El Delincuente Honrado,' a translation of the first book of 'Paradise Lost,' besides several poetical pieces; an éloge on Ventura Rodriguez, the eminent architect; a dissertation on English architecture, &c. A biographical memoir of him was published by his friend Cean Bermudez (the well known author of several works on the fine arts), under the title of 'Memorias para la Vida del Exc. Sen. Don G Jovellanos, y Noticias analiticas de sus Obras.'

JOVIA'NUS, FLA'VIUS CLAU'DIUS, born A.D. 331, was the son of Veronianus, of an illustrious family of Mœsia, who had filled important offices under Constantius. Jovianus served in the army of Julian in his unlucky expedition against the Persians, and when that emperor was killed, A.D. 363, the soldiers proclaimed him his successor. His first task was to save the army, which was surrounded by the Persians, and in great distress for provisions. After repelling repeated attacks of the enemy, he willingly listened to proposals for peace, which were—that the Romans should give up the conquests of former emperors westward of the Tigris, and as far as the city of Nisibis, which was still in their hands, but was included in the territory to be surrendered up to Persia, and that moreover they should give no assistance to the king of Armenia, then at war with the Persians. These conditions, however offensive to Roman pride, Jovianus was obliged to submit to, as his soldiers were in the utmost destitution. It is a remarkable instance of the Roman notions of political honesty, that Eutropius reproaches Jovianus not so much with having given up the territory of the empire, as with having observed so humiliating a treaty after he had come out of his dangerous position, instead of renewing the war, as the Romans had constantly done on former occasions. Jovianus delivered Nisibis to the Persians, the inhabitants withdrawing to Amida, which became the chief Roman town in Mesopotamia. On his arrival at Antioch, Jovianus, who was of the Christian faith, revoked the edicts of Julian against the Christians. He also supported the orthodox or Nicene creed against the Arians, and he showed his favour to the bishops who had formerly suffered from the Arians, and especially to Athanasius, who visited him at Antioch. Having been acknowledged all over the empire, Jovianus, after staying some months at Antioch, set off during the winter to Constantinople, and, on his way, paid funeral honours to Julian's remains at Tarsus. He continued his journey in very severe cold, of which several of his attendants died. At Ancyra he assumed the consular dignity, but a few days after, being at a place called Dadastana in Galatia, he was found dead in his bed, as some say being suffocated by the vapour of the charcoal burning in his room, according to others by the steam of the plaster with which it had been newly laid, whilst others again suspected him to have been poisoned or killed by some of his guards. He died on the 16th of February, A.D. 364, being 33 years of age, after a reign of only seven months. The army proclaimed Valentinianus as his successor.





Coin of Jovianus.
British Museum. Actual Size. Gold.

JOVI'NUS, born of an illustrious family of Gaul, assumed the imperial title under the weak reign of Honorius, and placing himself at the head of a mixed army of Burgundians, Alemanni, Alani, &c., took possession of part of Gaul A.D. 411. Ataulphus, king of the Visigoths, offered to join Jovinus and share Gaul between them, but Jovinus having declined his alliance, Ataulphus made peace with Honorius, attacked and defeated Jovinus, and having taken him prisoner at Valence, delivered him to Dardanus, prefect of Gaul, who had him put to death at Narbo (Narbonne) A.D. 412.





Coin of Jovinus.
British Museum. Actual Size. Gold.

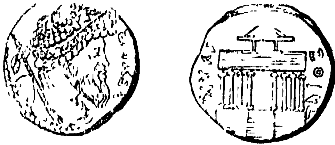
JO'VIUS, PAUL. [GIOVIO.]

JUAN FERNANDEZ. [FERNANDEZ.]

JUAN DE ULLOA. [MEXICO.]

JUAN DEL RIO. [MEXICO.]

JUBA I., son of Hiempsal, king of Numidia, succeeded his father about the year 50 B C. He was a warm supporter of the senatorial party and Pompey, moved, it is said, by a gross insult which in his youth he had received from Cæsar. He gained, B.C. 49, a great victory over Curio, Cæsar's lieutenant in Africa. After the battle of Pharsalia and the death of Pompey, he continued steady to his cause; and when Cæsar invaded Africa, B.C. 46, he supported Scipio and Cato with all his power, and in the first instance reduced the dictator to much difficulty. The battle of Thapsus turned the scale however in Cæsar's favour. Juba fled; and finding that his subjects refused to receive him, put an end to his life in despair. His connection with Cato has suggested the underplot of Addison's tragedy



Coin of Juba I.
British Museum. Actual Size. Silve

JUBA II., his son, was carried to Rome by Cæsar, kindly treated, and well and learnedly educated. He gained the friendship and fought in the cause of Augustus, who gave him the kingdom of Mauritania, his paternal kingdom of Numidia having been erected into a Roman province. He cultivated diligently the arts of peace, was beloved by his subjects, and had a high reputation for learning. He wrote, in Greek, of Arabia, with observations on its natural history; of Assyria; of Rome; of painting and painters; of theatres; of the qualities of animals, on the source of the Nile, &c Juba married Cleopatra, the daughter of Antony and Cleopatra queen of Egypt. Their medal, which is here given, has IVBA REX on one side, and ΚΛΕΟΠΑΤΡΑ ΒΑCΙΛΙCCΑ on the other. Strabo in his 6th book speaks of Juba as living, and in his 17th and last book as then just dead. This would probably fix his death about A D. 17. (Clinton's *Fasti*; Dion Cass.; Cæs., *Bell Civ*; Pliny, *Hist. Nat.*, lib. v. 1, &c; see the Abbé Sevin, *Sur la Vie et les Ouvrages de Juba*, in *Acad. des Inscript*, vol. iv., p. 457.)



Coin of Juba II
British Museum. Actual Size. Silver.

JUDAH, JUDÆA. [JEWS; PALESTINE.]

JUDAISM includes, in its most extensive signification, not only the system of religion which is believed in by the Jews, but also all those laws, moral, civil, political, and ritual, which are contained in the five books of Moses. Some of the peculiar tenets of this religion were imparted to Abraham, the ancestor of the Jewish people; but it did not receive its full development till after the departure of the Israelites from Egypt and their arrival at Mount Sinai, where the Supreme Being imparted to Moses the whole system of the Jewish economy. After the destruction of Jerusalem by the Romans, and the dispersion of the Jews over the various countries of the world, all those laws which related to government, and which could only be enforced in a country where the Jews possessed political power, necessarily became obsolete; and the term Judaism has consequently been restricted to those religious and moral laws which are contained in the 'Pentateuch,' and which are recognised by the Jews to the present time as the rule of their faith and conduct. The peculiar characteristics of Judaism, with a history of its rise and progress, are given in the article JEWS.

An interesting account of the ceremonial rites and religious and philosophical opinions of the modern Jews (that is, of those who lived during and subsequently to the time of Christ) is given in Allen's 'Modern Judaism,' London, 1816, 2nd ed. 1830

JUDAS MACCABÆUS succeeded his father Mattathias (B.C. 166) as the leader of the Jews in their patriotic attempts to throw off the yoke of the Syrian kings (1 *Macc.* iii. 1). He greatly distinguished himself in the war by his military talents, his personal courage, and his implacable hostility to the Syrian princes. Immediately after his father's death he defeated two Syrian armies; and in the following year conquered Lysias and Gorgias, who had been sent against him with much larger forces. He afterwards took possession of Jerusalem, purified the Temple from all idolatrous pollutions, and restored the national worship. He strengthened his power by subduing the Idumæans and Ammonites and other nations bordering upon Palestine. The unexpected success of Judas greatly exasperated Antiochus, who swore that he would destroy the whole Jewish nation, but he died before he could make preparations for the conquest of the country. He was succeeded by Antiochus Eupator, who marched against Jerusalem, but was obliged to raise the siege and return to Upper Asia in consequence of a revolt of a powerful noble. Before he left Palestine he entered into an alliance with Judas. This treaty however was soon broken by the Syrian king; fresh armies were sent against Judas, which were all defeated by this intrepid warrior. Anxious to render Judæa independent, and feeling the difficulty of continuing the contest against the whole power of the Syrian empire, he sent ambassadors to Rome to solicit an alliance with the Roman people (1 *Macc.* i. 8; *Justin*, xxxvi. 3). This was readily granted by the Romans; but before Judas could receive any assistance from his new allies, Palestine was again invaded by a Syrian army of 22,000 men under the command of Bacchides. Judas had only 3000 men with him, and his number afterwards diminished to 800; but with these he ventured to attack the Syrians, and after an obstinate struggle was at length defeated, and perished in the contest (B.C. 160).

(*The First Book of the Maccabees*; Josephus's *Jewish Antiquities*; Prideaux's *Connexion*; Jahn's *Hebrew Commonwealth*.)

JUDE, THE EPISTLE OF SAINT, a book of the New Testament, was probably written by the Apostle Jude, who was surnamed Lebbæus (Λεββαῖος) and Thaddæus (Θαδδαῖος) (*Matt.*, x. 3; *Mark*, iii. 18; *John*, xix. 22). He is also called the brother of James (*Luke*, vi. 16; *Acts*, i. 13), and the brother of Christ (*Matt*, xiii. 55). This James was probably 'James the Less,' the son of Alphæus and Mary (*Matt.*, x. 3; xxvii. 56; *Mark*, xv. 40), who was also the brother of Christ. The meaning of the 'brother of Christ' has been already discussed under JAMES. It has however been maintained that this epistle could not have been written by the Apostle Jude, since he does not describe himself as an apostle, but, on the contrary, refers to the authority of the apostles as superior to his own (v. 17). (De Wette's *Lehrbuch*, sec. 182.)

The object of this epistle is to guard believers against the false teachers who had crept into the church, and to exhort them to persevere in their Christian profession. There is a great similarity between this epistle and the second epistle of St. Peter. Hug, in his Introduction to the New Testament, argues, that since 'the language of Jude is simple, unpremeditated, and expressive, without ornament; while that of Peter is artificial, and has the appearance of embellishment and amplification,' the epistle of Jude was written first, and was used by St. Peter in the composition of his second epistle. The epistle of Jude appears to have been written shortly before the destruction of Jerusalem.

The canonical authority of this epistle has been rejected by many, because the apocryphal books of Enoch and the Ascension of Moses are supposed to be quoted in it (v. 14, 9). It is not contained in the 'Peshito,' and is classed by Eusebius among the *Antilegomena* (*Hist. Ecc.*, ii. 23; iii. 25). Origen also expresses doubts respecting it (*Comment. in Matt.*, iii. 814); but the greater number of the fathers refer to it as a work of divine authority.

(The *Introductions* of Michaelis, Eichhorn, De Wette, Bertholdt, Hug, and Horne; and the *Commentaries* of Hänlein (1799) and Laurmann (1818).)

JUDEX, JUDI'CIUM. It is of some importance to form a correct notion of the terms *judex* and *judicium* in the Roman writers. The *judicia privata* were those in which one party claimed something of or against another party, and must be distinguished from the *judicia publica*. The former had relation to *actiones*, and may be generally described as Civil actions; the latter were of the nature of Criminal prosecutions.

In the Judicia Privata the party complainant (actor) came before the prætor or other magistrate who had jurisdiction (jurisdictio), and made his claim or complaint, to which the defendant (reus) might put in a plea (exceptio). The prætor then made an order by which he referred the matter to Judices or Recuperatores, or Arbitri, whose chief office was to ascertain the facts in dispute. The formula, or order of the prætor, was of the nature of a provisional decree: it stated the matter at issue between the parties and the judgment that was to follow upon the determination of the facts. The plaintiff had to prove his case, or the defendant to prove his plea, before the judices. Sometimes there was only one judex. The speech of Cicero 'Pro Publio Quintio' was made before a single judex, aided by assessors (consilium).

The patroni or orators appeared before the judices to support the cause of their clients. The judices were sworn to act impartially. Witnesses were produced on each side and examined orally; and it is clear from the remarks of Cicero (*Pro Cæcina*, c. 10), where he is commenting on the evidence in the case of Cæcina, that he had cross-examined and put to confusion an impudent witness on the other side (see also the Oration *Pro Flacco*, c. 10). It is clear also from the oration 'Pro Cæcina,' that the inquiry before the judices was public. Written documents, such as letters and books of accounts, were produced before the judices by way of evidence. (Cicero, *Pro Q. Roscio.*) When the orators had finished their speeches, the judices decided by a majority. The sentence was, if necessary, perhaps in some cases carried into effect by the lictors of the magistrate who appointed the judices. The form in which the judices pronounced their decision was that of a judgment or decree.

The difference between the judicium and arbitrium was this: in the judicium, the claim, demand, or damages, was a sum fixed; in the arbitrium it was a sum uncertain; and this difference was attended with certain variations in the procedure. This is very clearly expressed by Cicero (*Pro Q. Roscio*, c. 4).

The judices must necessarily to some extent have settled questions of law, inasmuch as the determination of the facts sometimes involved the interpretation of the law. They were accordingly allowed to have assessors (consilium) learned in the law (juris-consulti), but the juris-consulti merely advised the judices, who alone delivered the decision. In case of doubt as to the law, the judices might consult the magistrate under whom they were acting; but as to the matters of fact, the judices were the sole judges, and could take no advice from the magistrate (*Dig.*, v. 1. 79). Gellius (xiv. 2) gives an amusing account of the difficulty which he felt on being appointed a judex, and how he got rid of the business by declaring on oath, as the judex always might do, that he could not come to any decision. The difficulty which he experienced was exactly one of those which a person not practically acquainted with legal proceedings would experience.

We may presume that the judices were generally persons qualified by a sufficient education, though they were not necessarily lawyers; but it does not appear that they were named out of any determinate class, and there is good reason for thinking that both parties generally agreed upon the judices, or at least had the power of rejecting them. It would seem as if every Roman citizen was considered competent to discharge the functions of a judex in civil actions, at least under the emperors: but this part of the subject is not free from difficulty.

Appeals from the decisions of the judices were not uncommon. (Ulpian, *Dig.*, xlix. 1, 1; Scaevola, *Dig.*, xlix. 1, 28.)

So far seems pretty well ascertained. Such being the qualifications of the judices, and the magistrates who had 'jurisdictio' being only annual functionaries, it appears that there was no class of men among the Romans, like our judges, who were the living interpreters of law for a series of years in succession. The juris-consulti seem to have kept the Roman law together as a coherent body, and it is from their writings alone that the *Digest* is compiled. [JUSTINIAN'S LEGISLATION.]

A court is often mentioned by the Roman writers, the origin and constitution of which, if they could be thoroughly ascertained, would throw great light on the Roman judicial system, and indeed on the Roman polity generally. We allude to the Judicium Centumvirale, which in the earlier times of the Republic was a court in which weighty matters of law were decided. This court gradually declined, but was restored by Augustus. The author of the dialogue 'De Causis Corruptæ Eloquentiæ' speaks of it as most flourishing in his time; but he proves its former decay by observing that there was not a single speech then extant made by any great orator before this court, except one which he mentions. Yet both L. Crassus and Q. Scaevola had pleaded before the Centumviri. (Cic., *De Orat.*, i. 39.) The origin, number, and constitution of this body are not known, though some writers say that the number was 105, three being chosen from each tribe. (Festus, *v.* 'Centumviralia.') But there were not thirty-five tribes till A.U.C. 513, and therefore it might be inferred that the Centumviral body was of comparatively recent date. However this does not necessarily follow from the words of Festus; and besides, such an explanation may be nothing more than his attempt to assign the origin of the court, without being able to trace it historically. The Centumviri were not *magistratus*, but a college of *judices*, who decided in Judicia Privata. The matters which came before them were only *actiones in rem*, or *vindicationes*, not *actiones in personam*, or actions founded on contracts or delicts: consequently the matters brought before them were actions affecting ownership, servitutes (easements), wills, and intestacies. (Cicero, *De Oratore*, i. 38, 39.) The Querela Inofficiosi Testamenti seems to have come before this court only. So far as is here stated seems to be pretty clearly made out. A valuable essay on this subject by Hollweg will give further information, and solve with some degree of probability various difficulties that may suggest themselves to the student. (Hollweg, *Ueber die Competenz des Centumviralgerichts*, *Zeitschrift für Geschicht. Recht.*, v., 358.) A more recent writer (Tigerström, *De Judicibus apud Romanos*) dissents altogether from Hollweg's view of the court of the Centumviri, and perhaps on some points he has shown him to be wrong. The value of Tigerström's essay however appears to be rather in the numerous passages which he has collected from the Roman writers than in the deductions which he has made from them.

It is not our purpose to treat at length of the Judicia Publica. They were in the nature of criminal prosecutions, in which any person, not disqualified, might be the prosecutor, and in which the verdict was followed by a legal punishment. Judices were employed here also, and were a kind of assessors to the magistrate, or the Judex Quaestionis, who presided. Both the accuser and the accused, as it seems, might challenge a certain number of the judices. Witnesses were examined before them: slaves by torture, freemen orally. The judices, at least in the more important matters, voted by ballot: each judex put into the urn the tablet of Acquittal, of Condemnation, or the tablet N. L. (non liquet, 'it is not clear'), according to his pleasure. The magistrate pronounced the verdict according to the tablets which made a majority. A lively picture of the intrigues and bribery which were not unusual on such trials is given by Cicero in speaking of the affair of Clodius and the Bona Dea (*Ep. ad Attic.*, i. 13, 16). The various changes made as to the body from which the judices were chosen appear to refer only to the judicia publica. [EQUITES.]

There is a distinction between judicia publica, judicia popularia, judicia extraordinaria, and judicia populi.

The title 'De Officio Judicis' in the 'Institutes' (iv. 17) contains merely general directions for the conduct of the judices.

It should be observed that this subject is not free from difficulty. What is above stated must be taken only as correct in the main features. Further inquiry is still wanted on several matters connected with the functions of the judices. Enough has been said to enable the reader to compare the Roman judices with the modern jury, and to show the difference of the institutions.

(Gaius, lib. iv.; Heineccius, *Syntagma, &c.*, by Haubold; Unterholzner, *Ueber die Rede Cicero für den Schauspieler Roscius*, *Zeitschrift*, &c., i. 248; and his remarks on the difference between the *condictio* and the *actio in personam*, with reference to the *judices*; 'De Judiciis,' *Dig.*, v. 1; 'De Judiciis Publicis,' *Dig.*, xlviii.; *Instit.* iv., tit. 18.) [INTERDICT.]

Dr. Pettingall's 'Enquiry into the Use and Practice of Juries among the Greeks and Romans,' London, 1769, may be consulted as to the functions of the Roman judices in the Judicia Publica. The author's conclusions seem in the main to be correct, though his essay is an ill-arranged and unmethodical production. The 'Attische Process,' by Meier and Schömann, and the essay of Pettingall, may be

consulted with reference to the functions of the Attic Dicastæ.

JUDICIARY. [Courts.]

JUDGES, THE BOOK OF (שֹׁפְטִים: κριταί, *Acts*, xiii. 20), a book of the Old Testament, which gives an account of the history of the Israelites from the death of Joshua to that of Samson. Joshua did not exterminate according to divine commandment all the nations of Canaan, but allowed each tribe to settle in the district of land allotted to it before the termination of the war. Since the tribes were not united by any national league, and were surrounded by powerful enemies, they were frequently conquered by the neighbouring nations and obliged to pay tribute. But they seldom remained in subjection for any length of time; they still retained much of the valour by which they were originally distinguished; and their patriotic efforts were usually directed or supported by a series of individuals, who were remarkable either for craft, bodily strength, or daring valour. These persons were called *Shophetim*, which is not very well translated by our English word 'Judges;' since, with the exception of Deborah (*Judges*, iv. 4, 5), none of them appeared to have exercised the judicial office till the time of Eli, who was also high-priest. After they had delivered their countrymen from their oppressors, they usually retired into private life (*Judges*, viii. 23, 29).

The book of Joshua consists of two distinct parts. The first, after an introduction on the state of the Israelites after the death of Joshua (ch i., ii.), gives an account of the exploits of the different Judges from Othniel to Samson (ch. iii.-xvi.). There were thirteen Judges, excluding Abimelech, who was made king by the men of Shechem (ix. 6), namely: Othniel (iii. 9); Ehud (iii. 15); Shamgar (iii. 31); Deborah (iv. 4); Barak (iv. 6); Gideon (vi. 11); Tola (x. 1); Jair (x. 3); Jephthah (xii. 7); Ibzan (xii. 9); Elon (xii. 11); Abdon (xii. 13); Samson (xv. 20). The second part of the book (ch xvii.-xxi.) gives an account of an idol that was worshipped first in the family of Micah (ch. xvii.), and afterwards in the tribe of Dan (ch. xviii.); and also a history of a barbarous act committed by the Benjamites of Gibeah, which led to a war between the tribe of Benjamin and all the other tribes; in which the former was nearly extirpated.

The author of the book and the time in which it was written are equally uncertain. It is commonly ascribed to Samuel, though some have argued, from *Judg.* xviii. 30, that it could not have been written till the time of the Babylonish captivity. It is probably however only a collection of different documents, composed at different periods; it does not give a continuous history of the people; and contains many things which could hardly have been written by the same individual. Many of its narratives are repeated in other books of the Old Testament; compare *Judg.* iv. 2; vi. 14; xi. 2, with 1 *Sam.* xii. 9-12; *Judg.* ix. 53, with 2 *Sam.* xi. 21; *Judg.* vii. 21, with *Is.* ix. 4; *Judg.* vii. 25, with *Ps.* lxxxiii. 11. Two or three verses in the song of Deborah are copied almost word for word in some of the Psalms; compare *Ps.* lxviii. 8, 9; xcvii. 5, with *Judg.* v. 4, 5.

The chronology of this book has occasioned considerable difficulty. The period of the Judges is usually estimated at 299 years, in consequence of a passage in the Book of Kings (1 *Kings*, vi. 1); in which it is said that 480 years elapsed from the departure of the Israelites from Egypt to the foundation of the temple by Solomon. St. Paul, on the contrary, gives 450 years as the period of the Judges (*Acts*, xiii. 20). The reader is referred for an excellent discussion of this subject to Michaelis's 'Chronologie des Buch der Richter,' in the 'Göttingisches Magazin' for 1780, p. 182; see also Michaelis's 'Orientalische Bibliothek,' b. v., p. 81.

The canonical authority of this book has never been disputed. It is placed in all the Hebrew MSS. immediately after the Book of Joshua. It is quoted by Philo and Josephus, and also by the author of the Epistle to the Hebrews (xi. 32).

(The *Introductions* of Eichhorn, Jahn, De Wette, Augusti, and Horne; Rosenmüller's *Scholia;* Serrarii *Judices et Ruth explanati*, Mainz, 1609, fol.; Schmidii *Commentar. in Jud.*, Strasb., 1684, 1706, 4to.)

JUDITH, an apocryphal book of the Old Testament, contains an account of the invasion of Syria and Judæa by Holofernes, general of Nabuchodonosor, king of the Assyrians, and particularly of the siege of Bethulia, a town in Judæa; and of the destruction of the Assyrian army, and the death of Holofernes through the courage and stratagem of Judith, the widow of Manasses, and an inhabitant of Bethulia. The historical and geographical difficulties of this book are so great, and its narrative so improbable, that a great number of critics are disposed to consider it as a religious romance, probably written in the time of the Maccabees, to encourage the Jews in their struggles against the Syrian monarchs. Grotius considers it as an allegory, written in the time of Antiochus Epiphanes; and that 'by Judith is meant Judæa; by Bethulia, the temple or house of God; and by the sword which went out from thence, the prayers of the saints; that Nabuchodnosor denotes the devil; and the kingdom of Assyria the devil's pride,' &c. Montfaucon (*La Verité de l'Histoire de Judith*), Huet (*Dem. ev. Prop.*, iv., p. 366), and Prideaux (*Connection*, vol. i., pp. 65-74), maintain, on the contrary, that it is a true history. Prideaux considers Nabuchodnosor to be the same person as Saosduchinus, the son of Esarhaddon, and grandson of Sennacherib; and Arphaxad, who is represented in Judith as the king of Media, to be only another name for Deioces. But in opposition to this it should be remarked that there are many passages in the book which refer to a time subsequent to the Babylonian captivity. Josephus also, who seldom neglects an opportunity of extolling the valour of his countrymen, takes no notice of this story.

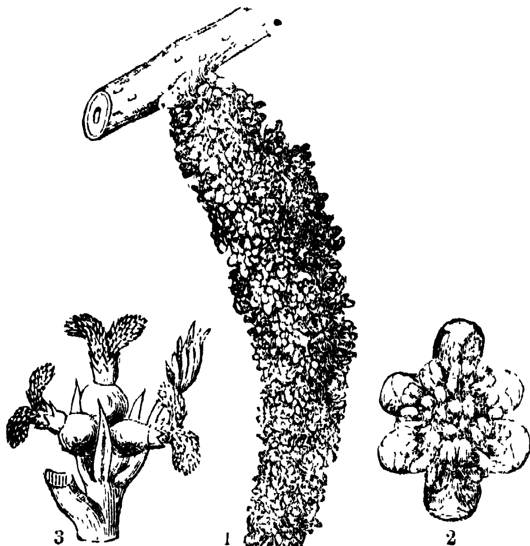
The book of Judith was originally written in Chaldee, from which it was translated into Latin by Jerome. It was also translated into Greek and Syriac. The English translation in the authorized version was made from the Greek, and differs in many respects from the translation of Jerome, which is still extant in the Latin vulgate.

There is a great similarity between the history of Judith and a tale which Quintus Curtius tells us respecting the death of Spitamenes (viii. 3).

(The *Introductions* of Eichhorn, Jahn, De Wette, Bertholdt, and Horne.)

JUGGERNAUTH. [Vishnu.]

JUGLANDA'CEÆ are a natural order of apetalous Exogenous plants, consisting of trees or shrubs having eatable nuts and somewhat resinous leaves. The former are the walnuts and hickory nuts of the markets; the first produced by the genus Juglans, the latter by that called Carya. The leaves are alternate and pinnated; the flowers usually monœcious, those which are male collected in catkins. The calyx of the latter consists of a few scales attached obliquely to a single bract, and surrounding a variable number of stamens; that of the females is superior. The ovary is one-celled, and has one solitary erect ovule, which changes into a 4-lobed seed, with crumpled cotyledons, enclosed in a two-valved nut, clothed with a fleshy epicarp. The common walnut (Juglans regia), a native of Persia, is well known for its excellent timber, from which musket-stocks (and formerly cabinet-work) are manufactured, for its agreeable wholesome nuts, and the sweet drying oil which they furnish when pressed. Carya alba, the white Hiccory, bears nuts like those of the walnut, only smaller, smoother, and with a thicker shell, and furnishes a valuable tough elastic white timber much em-



Juglans regia.

1, a catkin of male flowers; 2, a single male flower; 3, a cluster of female flowers.

ployed in the construction of carriages and other vehicles. Other species of Hickory are also eaten, especially the Peccan nut, the produce of Carya olivaformis, a small and delicate sort. Although the fruit of these plants is eaten, it contains a purgative principle, which renders some of the species cathartic, as is the case with Juglans cathartica and nigra, two North American species; and even the common walnut participates so much in this quality, when the fruit is young, that a laxative conserve well known in domestic medicine is prepared from it. Juglans nigra, the Black American Walnut, is a tree of remarkable size and beauty.

JUGULAR VEINS are the large trunks by which the greater part of the blood is returned to the heart after having circulated in the head, face, and neck. There are two on each side, an external or superficial, and an internal or deep. The external jugular lies on each side just under the skin, and extends from near the angle of the jaw to the middle of the clavicle, behind which it opens into the subclavian vein. It conveys the blood of the confluent streams from the jaws, temples, and front and sides of the neck, and of some of those from the face. The internal jugular, which is far larger than the external, lies deep in the neck, by the side of the carotid artery. It receives all the blood from the skull and the brain, from the eyes and ears, and from the scalp, face, tongue, palate, pharynx, &c. The internal jugular veins extend from the base of the skull just in front of the vertebral column, down the neck, to some depth behind the clavicles, where they unite with the subclavian veins, by which all the blood is brought from the arms and upper part of the chest and neck to form the venæ innominatæ, which by their union form the vena cava superior, which opens directly into the right auricle of the heart. [HEART.]

JUGURTHA, the illegitimate son of Manastabal, by a concubine, and grandson of Masinissa, was brought up under the care of his uncle Micipsa, king of Numidia, who sent him with an auxiliary force to join Scipio Æmilianus, in his war against Numantia in Spain. Jugurtha so distinguished himself as to become a great favourite with Scipio, who, at the conclusion of the war, sent him back to Africa with strong recommendations to Micipsa. Micipsa adopted him, and declared him joint heir with his own two sons Adherbal and Hiempsal. After Micipsa's death (B.C. 118), Jugurtha, aspiring to the undivided possession of the kingdom, effected the murder of Hiempsal, and obliged Adherbal to escape to Rome, where he appealed to the senate. Jugurtha however found means to bribe many of the senators, and a commission was sent to Africa in order to divide Numidia between Jugurtha and Adherbal. The commissioners gave the best portion to Jugurtha, who, not long after their departure, invaded the territory of his cousin, defeated him, besieged him in Cirta, and having obliged him to surrender, put him to a cruel death; and this almost under the eyes of Scaurus and others, whom the Roman senate had sent as umpires between the two rivals (B.C. 112). This news created great irritation at Rome, and in the following year, under the consulship of Scipio Nasica and Calpurnius Bestia, war was declared against Jugurtha, and an army was sent to Africa under Calpurnius, accompanied by Scaurus, with other senators as his advisers. After some fighting, Jugurtha obtained under most favourable conditions the quiet possession of the usurped kingdom. The treaty however was not ratified at Rome; and Calpurnius being recalled, the new consul Posthumius Albinus was appointed to the command in Africa. Meantime Jugurtha, being summoned, appeared at Rome; but as he then succeeded in bribing several of the senators, and also Bæbius, a tribune of the people, no judgment was given. Jugurtha, emboldened by this success, caused Massiva, son of his uncle Gulussa, whom he suspected of aiming at his kingdom, to be assassinated in the Roman capital. The crime was traced to Jugurtha, but as he was in Rome under the public guarantee, the senate, instead of bringing him to trial, ordered him to leave Rome immediately.

It was then that Jugurtha is said to have exclaimed against the venality of that city, 'which would willingly sell itself if it could find a purchaser wealthy enough to bid for it.' Posthumius was sent to Africa to prosecute the war, but he soon returned to Rome without having effected anything, leaving the army under the command of his brother Aulus Posthumius, who allowed himself to be surprised in his camp by Jugurtha, to whom he surrendered himself; and his army, having passed under the yoke, evacuated Numidia. The new consul, Metellus, arriving soon after with fresh troops, carried on the war with great vigour, and being himself above temptation, reduced Jugurtha to the last extremity. Caius Marius was serving as lieutenant to Metellus, whom in the year B.C. 107 he supplanted in the command. Jugurtha meantime having allied himself with Bocchus king of Mauritania, continued to give full employment to the Romans. Marius took the towns of Capsa and Moluca, and in a hard contested battle defeated the two kings. Bocchus made offers of peace, and Marius sent to him his quæstor Sulla, who after much negotiation induced Bocchus to give up Jugurtha into the hands of the Romans as the price of his own peace and security. Bocchus hesitated awhile, but at last, having appointed a conference, he had Jugurtha seized and delivered over to the Romans. Jugurtha followed in chains, with his sons, the triumph of Marius, after which he was thrown into the Mamertine subterraneous dungeon, the soldiers having stripped him of all his clothes, and even torn his ears for the sake of the earrings which he wore. He was starved to death in his prison; or, as some say, he was strangled. His two sons were sent to Venusia, where they lived in obscurity. The war against Jugurtha lasted five years; it ended in the year 106 B.C. (Sallustius, *De Bello Jugurthino*; Eutropius.)

JULIA'NUS, FLA'VIUS CLAU'DIUS, son of Julius Constantius, brother of Constantine the Great, was born A.D. 331. After Constantine's death, the soldiers massacred the brothers, nephews, and other relatives of that prince, in order that the empire should pass undisputed to his sons. [CONSTANTIUS.] Two only escaped from this butchery, Julian, then six years old, and his half-brother Gallus, then thirteen years of age. Marcus, bishop of Arethusa, is said to have concealed them in a church. After a time Constantius exiled Gallus into Ionia, and entrusted Julian to the care of Eusebius, bishop of Nicomedia. Julian was instructed in Greek literature by Mardonius, a learned eunuch, who had been teacher to his mother Basilina. At the age of fourteen or fifteen he was sent to join his brother Gallus at Macellum, a castle in Cappadocia, where they were treated as princes, but closely watched. (Juliani *Opera*, *Epistle to the Athenians*.) The youths were taught the Scriptures, and were even ordained lecturers, and in that capacity publicly read the Bible in the church of Nicomedia. It appears that Constantius had the intention of making a priest of Julian, who had no inclination for that profession, and who is supposed to have already secretly abandoned the belief in the Christian doctrines. The death of Constans and Constantine having left Constantius sole master of the Roman world, that emperor, who was childless, sent for Gallus, in March, 351, and created him Cæsar, and he allowed Julian to return to Constantinople to finish his studies. There Julian met with the sophist Libanius, who afterwards became his friend and favourite. Constantius soon after again banished Julian to Nicomedia, where he became acquainted with some Platonist philosophers, who initiated him into their doctrines. He afterwards obtained leave to proceed to Athens, where he devoted himself entirely to study. After the tragical death of Gallus, in 355, Julian, who had again for a time awakened the jealous suspicions of his cousin, was recalled to court by the influence of the Empress Eusebia, his constant patroness, when Constantius named him Cæsar, and gave him the government of Gaul, which was then devastated by the German tribes, together with his sister Helena to wife. Julian made four campaigns against the Germans, in which he displayed great skill and valour, and freed Gaul from the barbarians, whom he pursued across the Rhine. He spent his winters at Lutetia (Paris), and became as much esteemed for his equitable and wise administration as for his military success. Constantius, always suspicious, ordered Julian to send him back some of the best legions in Gaul, to be employed against the Persians. When the time for marching came, in the year 360, Julian assembled the legions at Lutetia, and there bade them an affectionate farewell, when an insurrection broke out among the soldiers, who saluted him as Augustus. Julian immediately sent messengers to Constantius to deprecate his wrath, but the death of the emperor happening at the time left the throne open to him (A.D. 361). He proceeded to Constantinople, where, being proclaimed emperor in December, 361, he reformed the pomp and prodigality of the household, issued several wise edicts, corrected many abuses, and established a court at Chalcedon to in-

vestigate the conduct of those who had abused their influence under the preceding reign. Unfortunately some innocent men were confounded with the guilty; among others Ursulus, whose condemnation Ammianus (b. xxii.) deplores. On assuming the purple Julian had openly professed the old religion of Rome and sacrificed as high-priest to the gods, and though at the same time he had issued an edict of universal toleration, he soon showed a marked hostility to the Christians: he took the revenues from the churches, and ordered that those who had assisted in pulling down the heathen temples should rebuild them. This was a signal for a fearful re-action and persecution against the Christians in the provinces, where many were imprisoned, tormented, and even put to death. Julian restrained or punished some of these disorders, but with no very zealous hand. There was evidently a determined struggle throughout the empire between the old and the new religion, and Julian wished for the triumph of the former. He forbade the Christians to read or teach others the works of the antient classics, saying that as they rejected the gods they ought not to avail themselves of the learning and genius of those who believed in them (Juliani *Opera*, Epist. 42, Spanheim's edition). He also forbade the Christians filling any office, civil or military, and subjected them to other disabilities and humiliations. Julian has been called the Apostate, but it seems very doubtful whether at any period of his life after his boyhood he had been a Christian in his heart; the bad example of the court of Constantius, and the schisms and persecutions that broke out in the bosom of the church, may have turned him against religion itself, while his vanity, of which he had a considerable share, and which was stimulated by the praises of the sophists, made him probably consider himself as destined to revive both the old religion and the glories of the empire. That he was no believer in the vulgar mythological fables is evident from his writings, especially the piece called 'The Cæsars,' and yet he professed great zeal for the heathen divinities, and he wrote orations in praise of the mother of the gods and of the sun. Making every allowance for the difficulties of his position and the effect of early impressions, he may be fairly charged with a want of candour and of justice, and with much affectation bordering upon hypocrisy. If we choose to discard the invectives of Gregory of Nazianzus, of Cyril, and of Jerome, we may be allowed at least to judge him by the narrative of Ammianus, and by his own works, and the result is not favourable to his moral rectitude or sobriety of judgment. A learned and very temperate modern writer, Cardinal Gerdil, in his 'Considérations sur Julien,' in the 10th volume of his works, has so judged him; he has formed his opinion, not on the fathers, but upon the accounts of Julian's panegyrists, Libanius and other heathen writers.

Julian, having resolved on carrying on the war against the Persians, repaired to Antioch, where he resided for several months. His neglected attire, his uncombed beard, and the philosophical austerity of his habits, drew upon him the sarcasms of the corrupt population of Antioch. The emperor revenged himself by writing a satire against them, called 'Misopogon,' and, what was worse, by giving them a rapacious governor. He set off on his expedition with a brilliant army, reckoned at 65,000 men, crossed the Euphrates, took several fortified towns of Mesopotamia, crossed the Tigris and took Ctesiphon, but here his progress ended. The close Roman legions were harassed on all sides by the light cavalry of the Persians, and reduced to great distress for want of provisions. Still they presented a formidable front to the enemy, and Sapor, the Persian king, was inclined to come to terms, when in a skirmish between the advanced posts of both armies, Julian, who had run to head his soldiers, neglecting to put on his cuirass, received a mortal wound from a javelin which pierced his side. Being carried to his tent he expired the following night, 26th June, 363. He died with perfect calmness and composure, surrounded by his friends, conversing on philosophical subjects, and expressing his satisfaction at his own past conduct, since he had been at the head of the empire. His remains were carried to Tarsus in Cilicia, according to his directions, and his successor Jovian erected a monument to his memory.

Julian had many brilliant and some amiable qualities; his morals were pure and even austere; his faults were chiefly those of judgment, probably influenced by the impressions of early youth, an ardent and somewhat mystic imagination, and the flattery of those around him. His works consist of orations, satires, 'The Cæsars,' and about eighty letters, some of which are very interesting. His letter to Themistius contains a treatise on the duties of sovereigns. His narrative of his Gaulish and German campaigns is unfortunately lost. The last and best edition of Julian's works is by Ezech. Spanheim, Leipzig, 1696, fol.; but it does not contain all the letters. A complete edition of the letters was published by L. H. Heyler, Mainz, 1828, 8vo. There is a French translation of Julian's works by La Bletterie, and a Life of him by Tourlet.



Coins of Julianus. British Museum Actual Size.

JULIAN PERIOD is a term of years often employed in chronology, in order to avoid the ambiguity attendant on reckoning any time antecedent to our æra. The Julian Period consists of 7980 years, and is reckoned as having begun 4713 years before our æra; so that the present year 1838 corresponds to 6551 Jul. Per. The æra of the creation, or Anno Mundi, which has been used by Christian and Jewish writers, cannot be considered a fixed point, as chronologists and controversialists are not agreed as to the precise time of its commencement, some placing the creation 4004 years B.C., others, such as the early Alexandrian Christians, 5502 B.C., and the Greeks and Russians at 5508 B.C. The Julian Period is produced by the multiplication of the lunar cycle 19, solar cycle 28, and Roman indiction 15. [PERIOD OF REVOLUTION.]

JÜLICH-CLEVE-BERG, one of the two principal subdivisions of the province of Rhenish Prussia, and formerly considered a distinct province, has an area of 3584 square miles, and a population of 1,140,435 inhabitants. It is bounded on the north-west and west by the Netherlands, on the north-east and east by Westphalia, and on the south and south-west by the second subdivision of the province, *i.e.* the Lower Rhine. The principal river is the Rhine, which is joined by the Sieg, Wipper, Erft, Ruhr, and Lippe. The Niers, which falls into the Masa, and the Alte Yssel, likewise flow through parts of this province. The canals worth notice are the Fossa Eugeniana, which has fallen nearly into ruin, and the North Canal, not yet completed. The soil cannot be called fruitful, except in the vicinity of the Rhine, and in general on the left bank of the Rhine, where there are extensive plains; in the part on the right bank of the Rhine (with the exception of the small northern tracts) it is for the most part stony and mountainous, being traversed by chains which are branches of the Westerwald. But these mountainous tracts are the seat of the most flourishing manufactures, especially the former duchy of Berg, where the manufactories in the circle of Elberfeld alone give employment to 40,000 persons. The Wipperthal (valley of the Wipper), in this part, is indisputably the seat of the most active manufacturing industry in Germany, where Elberfeld, Gemarke, Barmen, Wipperfeld, and Reitershausen now almost form one connected town; and the finest buildings and the richest manufactories spring up every year. On the Rhine, near Königswinter, rises in singular forms, with seven summits, the Siebengebirge, viz. nearest the Rhine, the steep Drachenfels, 1473 feet high; then the Wolkenberg, 1482 feet; the Stromberg, with a chapel on the top; behind these, and rather farther from the Rhine, the Löwenberg, 1896 feet high; the Nieder or Nonnen-Stromberg; the Oelberg, 1827 feet high; and the Hemmerich. Ruins of antient castles are still seen on these mountains. This main subdivision of the Rhenish province consists of—1. the government of Düsseldorf, with an area of 2064 square miles, which now (1838) has 766,837 inhabitants, or 371 to the square mile; the city of Düsseldorf has 21,858 inhabitants; 2. the government of Cologne, with an area of

1520 square miles, and a population of 426,694 inhabitants; the city of Cologne has 69,051 inhabitants.

JU'LIUS I. succeeded Marcus in the see of Rome A.D. 336. Athanasius having been driven by the Eusebian party from his see of Alexandria, it was agreed by many of the Eastern bishops that the dispute should be settled in a council to be assembled at Rome. The council was convoked A.D. 340, and Athanasius appeared, but not his adversaries, who convened another synod at Antioch, which excluded Athanasius from his see. Julian remonstrated, but in vain. [ATHANASIUS, ST.] The general council of Sardica was next convened, but a schism soon broke out in that assembly, and the parties excommunicated each other. This is the council which is said to have granted to the see of Rome the right of arbitration in cases concerning the deposition of bishops; but this is a point much controverted. Julius died in the year 352. Two letters of his to the Eusebians and the Church of Alexandria are extant. (Constant., *Epistolæ Roman. Pontif.*) Others have been falsely attributed to him, as well as ten decretals, which are spurious.

JULIUS II., Cardinal della Rovere, nephew to Pope Sixtus IV., succeeded Pius III. in the year 1503. He had distinguished himself under preceding pontificates by his haughty temper and warlike disposition, which were fitter for the sword than the crosier. After his exaltation to the papal throne he began by driving Cesare Borgia out of his ill-gotten possessions in the Romagna; but there he found another power, the Venetians, who, during the preceding troubles, had taken possession of Ravenna, Rimini, and other places. The Venetians offered to pay tribute to the see of Rome for those territories, but Julius refused, and demanded their absolute restitution to the Church. After fruitless negotiations, Julius, in 1508, made a league with Louis XII., the Emperor Maximilian, and the duke of Ferrara, against Venice. This was called the League of Cambrai, and its object was the destruction of the republic of Venice and the partition of its territories. Venice however stood firm, although its armies were defeated and its territories were ravaged by both Germans and French with their usual atrocity. At last Julius himself, having recovered the town of Romagna, perceived the impolicy of uniting with ultramontane sovereigns against the oldest Italian state, and accordingly in February, 1510, he made peace with Venice. Wishing to undo the mischief which he had done, and to drive the foreigners, whom he styled 'barbarians,' out of Italy, he first sought to arm the Germans against the French, whom he dreaded most, but not succeeding, he called to his aid the Swiss. The pope himself took the field against the French in Lombardy, and attacked and took the town of La Mirandola, entering it by a breach, in January, 1511. The next campaign was unfavourable to Julius, and he lost Bologna. But in the following October his legates succeeded in forming a league, which he called 'holy,' with Ferdinand of Spain, Henry of England, the Venetians, and the Swiss. The campaign subsequent, in 1512, was marked by the battle of Ravenna and the death of Gaston de Foix, the French commander, followed by the total expulsion of the French from Lombardy. But this was effected by the Swiss, German, and Spanish troops, and Julius merely succeeded in driving one party of foreigners out of Italy by means of other foreigners, who meantime subverted the republic of Florence, and gave it to the Medici. In the midst of these events, Julius died of an inflammatory disease, on the 21st February, 1513. He was succeeded by Leo X. Julius was fond of the fine arts; he patronized Bramante, Michel Angelo, and Raphael, and he began the structure of St. Peter's Church.

JULIUS III., Cardinal Giocci, succeeded Paul III. in 1550. He re-opened the sittings of the Council of Trent, which had been suspended under his predecessor. He quarrelled with France and with Venice, and also with Ferdinand, king of the Romans and brother to Charles V., and died in March, 1555, leaving behind him a very indifferent character marked by incapacity and misconduct.

JULY, now the seventh, was originally the fifth month of the year, and was called by the Romans, in regard to its numerical station, *Quintilis*. Mark Antony altered the name to Julius, the gentile name of Caius Cæsar, the Dictator, who was born in it. So Festus, '*Julium mensem appellarunt quod eo mense dicitur Julius natus*.'

In the old Latin or Alban calendar, Quintilis had a complement of 36 days. Romulus reduced them to 31; Numa to 30; but Julius Cæsar restored the day of which Numa had deprived it, which it has ever since retained.

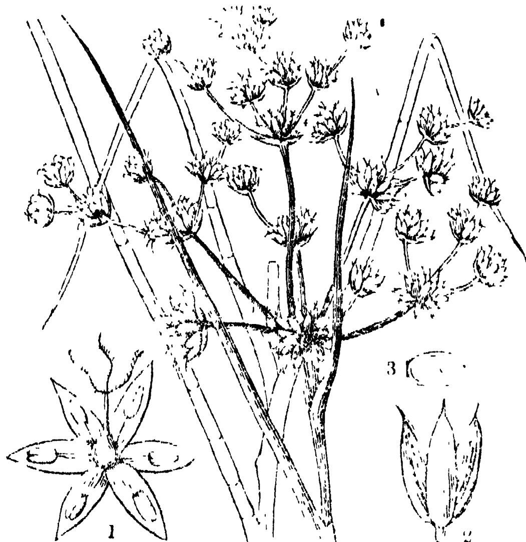
Our Anglo-Saxon ancestors called July *Mæd-monath*, 'mead month,' from the meads being then in their bloom; and *æftera-litha monath*, 'the latter mild month,' in contradistinction to June, which they considered and named as 'the former mild month.'

On the 3rd of this month the Dog-days are supposed to begin.

(Pitisci *Lexicon*, i. 985; Brady's *Clavis Calendaria*, i. 74; Bosworth's *Anglo-Saxon Dict.*, v. 'Monath.')

JUMNA. [HINDUSTAN.]

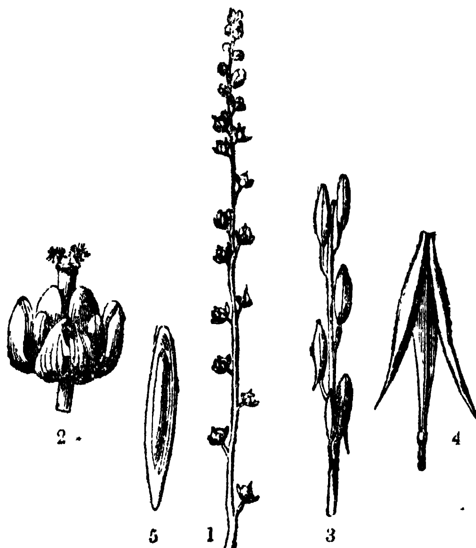
JUNCA'CEÆ, a small natural order of Endogenous plants, so named from Juncus, the rush, which is considered its type. It is principally composed of obscure herbaceous plants, with brown or green glumaceous hexandrous flowers, and would perhaps be with more propriety considered a section of Liliaceæ than a separate order. It forms one of the transitions from complete Endogens to the imperfect glumaceous form of that class.



Juncus articulatus.

1, a flower spread open; 2, a capsule; 3, a seed cut through its longer axis, showing the embryo.

JUNCAGINA'CEÆ are a small and unimportant order of Endogens, consisting of marsh plants with thin minute scaly flowers formed of 3 sepals, 3 petals, and as many stamens, which are opposite them. Their ovaries are 3 or 6 in number, contain each 1 or 2 ascending ovules, and, when ripe, form a dry fruit. The embryo has a lateral slit for the emission of the plumule, on which account they are



1, Triglochin palustre; 2, a flower magnified; 3, a spike of ripe fruit; 4, a ripe capsule; 5, a section of one of the cells of the capsule, with the seed enclosed in it.

regarded as allied to Araceæ. Triglochin is the commonest genus of the order, and inhabits the fresh or salt marshes of most parts of Europe.

JUNCUS ODORA'TUS. In old works on Materia Medica, as well as in many modern ones, we find a fragrant plant referred to under this name, and which is usually thought to be a kind of grass. Dr. Alston and some other writers gave as its synonymes Fœnum camelorum, Palea de Mecha, and more especially Schœnanthus, under which indeed it should be described, as it is with good reason thought to be Schœnus (σχοῖνος) of Dioscorides. See SCHŒNANTHUS, where also will be described the plant which appears to be the *Calamus aromaticus* of the antients, as the two are very closely allied.

JUNE, the sixth month of the year, named from the Latin Junius. Ovid, in his *Fasti* (vi. 25), makes Juno assert that the name was expressly given in honour of herself.

> 'Ne tamen ignores vulgique errore trahamur,
> Junius à nostro nomine nomen habet'

In another part of the *Fasti* (vi. 87) he gives the derivation *à junioribus*; as May had been derived from *Majores*.

> 'Junius est juvenum; qui fuit ante senum'

Those who derive the name from Junius Brutus, who began his consulship in this month, forget that, according to tradition, it had received the appellation long before.

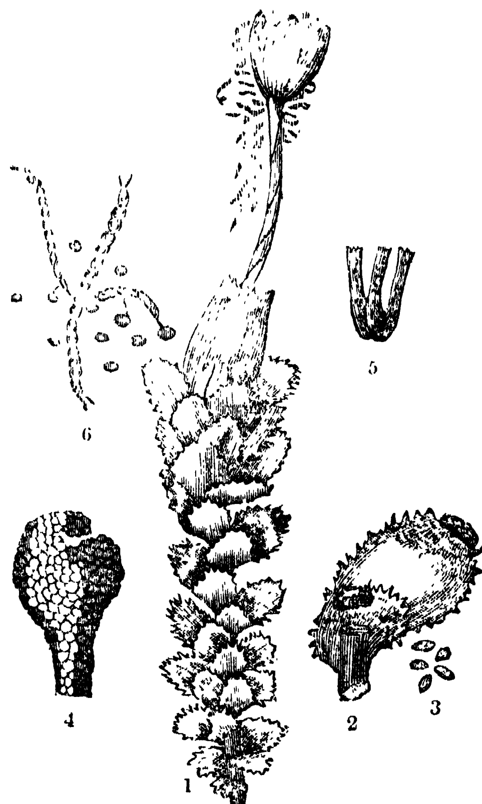
In the old Latin or Alban calendar June was the fourth month, and consisted of twenty-six days. Romulus is said to have assigned it a complement of thirty days. Numa, who made it the sixth month, deprived it of one day, which was restored by Julius Cæsar, since which time it has remained undisturbed.

The Anglo-Saxons had several names for the month of June. They called it *sear-monath*, 'dry month;' *midsumer-monath*, 'midsummer month;' and *æra-litha monath*, 'the other mild month,' in contradistinction to July.

In this month is the summer solstice. Pitiscus tells us that in the Roman times the month of June was considered to be 'nuptiis aptissimus.'

(Pitisci *Lexicon*, i. 986; Brady's *Clavis Calendaria*, i. 71; Bosworth's *Anglo-Saxon Dict.*, v. 'Monath.')

JUNGERMANNIA'CEÆ, a rather extensive natural order of Cryptogamic plants, or Acrogens, resembling mosses in appearance, but very distinct from them in many points of structure. Their foliage is much more cellular, their seed-vessel, or theca, splits into 4 valves, has no operculum, and instead of a central column has a number of tubes, each furnished internally with a double elastic spiral thread, and called an *elater*, to which the spores stick, and by the aid of which they are supposed to be dispersed. The species inhabit the trunks of trees, damp earth, or even the young shoots and leaves of other plants in cool moist climates, especially such as are temperate. Some have the stem and leaf formed into a frond, or thallus, resembling that of a lichen, but more commonly the species have leaves with stipules at their base. A large number of genera has of late been formed out of the old genus Jungermannia, but the opinions of botanists are much divided as to the value of these new divisions; and they have not been generally adopted. Hooker's *Monograph of the British Jungermanniæ* gives a valuable account of the species inhabiting these islands. A more recent account of the whole European genus is to be found in Nees v. Esenbeck's *Naturgeschichte der Europäischen Lebermoose*, 2 vols. 8vo. with plates.



Jungermannia nemorosa, highly magnified.

1, A branch in fruit. 2, A leaf, with sori upon it. 3, The contents of those sori. 4, The calyptra, before it is burst by the theca. 5, Abortive thecæ, in a very young state. 6, Elaters.

JUNI'PERUS, a genus of hardy, evergreen, woody plants, belonging to the natural order Coniferæ. Its distinctive character consists in its female fructification being succulent, consolidated, and reduced in the number of its parts below what is usual in the order to which the genus belongs. Like other Coniferæ, its fruit is composed of scales representing carpels spread open, and collected in a spiral manner round a common axis. But they are not more than six in number, generally three, and when ripe are fleshy and consolidated into a body resembling a drupe. In the language of the Pharmacopœia they are *berries*, in that of botanists they are termed *Galbuli*.

About twenty species are known, the most important of which are the following:

1. *J. Communis* (Common Juniper). This is a common bush, with long, narrow, sharp-pointed leaves, which are concave and glaucous on the upper side, but convex and green on their under, and with blackish fruit. It grows wild in all the northern parts of Europe, and, as is said, in North America also and the north of India, but it is doubtful whether the plants called Juniper by travellers in the Himalaya Mountains are not some other species. Occasionally the Juniper becomes a small tree. The fruit is used in considerable quantities in the preparation of gin, and in medicine as a powerful diuretic; a kind of beer called *genévrette* is also obtained in some parts of France by fermenting it with barley. Oil of Juniper, obtained from the Galbuli, is said to be the most powerful of all diuretics in doses of four drops.

2. *J. Sabina* (the Savin). This species is readily known from the last by its leaves being small, scale-like, and pressed close to the stem, besides which, its fruit is a light bluish green. It forms a compact gloomy-looking bush, in some cases spreading near the ground, in others acquiring the stature of a low tree. It is found wild in the middle of Europe and the west of Asia, inhabiting the most sterile soil, and is frequently met with in this country in shrubberies. Like the common Juniper, it is a diuretic and uterine stimulant, but is so powerful that its use is highly dangerous, except in the hands of regular practitioners. It is a well-known violent emmenagogue. Oil of Savin is a local irritant, producing blisters when applied to the skin; taken internally it is drastic and emetic.

3. *J. Virginiana* (the red cedar). Notwithstanding its popular name this is not generally the plant that yields the cedar wood used by cabinet-makers and pencil manufacturers, the Bermuda cedar being principally so employed, its timber however is of great excellence and durability. It is a native of North America, from Cedar Island in Lake Champlain as far as the southern side of the Gulf of Mexico, chiefly preferring the vicinity of the sea. In general it is a large bush; but in favourable situations, and in such a climate as that of Virginia and Carolina, it becomes a tree 40 feet high. The branches of this species are erect, the leaves arranged in threes, small, scale like, and but little spreading; the fruit is deep blue, covered with a mealy resinous powder. A great many fine plants occur in this country; it is not however with us an object of any importance to the forester, except for the sake of variety.

4. *J. Bermudiana* (the Bermuda red cedar). Very little known in Great Britain, in consequence of its not bearing the climate without protection. It is a native of the Ber

mudas, where it becomes a large tree, with a soft fragrant wood, the value of which is well known from its use in cabinet-work and the manufacture of pencils. It has, when young, long narrow spreading leaves growing in threes, but on the branches of old trees they become shorter, are placed in fours, and thus give the shoots a four-cornered appearance.

Of the other junipers, *J. excelsa* and *J. Chinensis* are handsome hardy trees; *J. Lusitanica* (the Goa cedar) is also of great beauty, because of its drooping habit and light grey branches, but it will not live long in England except in the warmest of the southern counties; and *J. Phœnicea* is a handsome bush: the others are of little moment.

JU'NIUS, FRANCISCUS. There are two learned persons of this name, father and son. The father was a Protestant minister in the Low Countries, best known by a translation of the Scriptures into the Latin tongue, in which he was assisted by Tremellius, whence it is usually called the version of Junius and Tremellius. He became professor of theology at Leyden, where he died in 1602. His son, the younger Francis Junius, of whom we are principally to speak, was born at Heidelberg in 1589, accompanied his father to Leyden, but soon relinquished study and embraced the profession of arms. On the cessation of hostilities in those countries in 1609 he gave up arms, and betook himself to literature as a profession. He came over to England in 1610, and was soon entertained as his librarian by Thomas Howard, earl of Arundel, a nobleman whose name, whenever it occurs, is found associated with some good deed connected with the higher interests of man. Junius remained 30 years in this honourable connection, during which time, having few distractions and an insatiable appetite for curious knowledge, he accumulated vast stores of information.

The more particular direction of his studies was towards the northern languages, or rather the various dialects of that great language which under the name of the Gothic or the Teutonic seems to have been spoken in the remotest ages by the people who inhabited both shores of the Baltic. We owe to him the publication of by far the most valuable relic of the literature of the people who spoke this language in what may be called its purity, a version of the gospels, commonly called Ulphilas' Version, and the manuscript which contains it, 'The Silver Codex.' This was printed with many learned notes and other illustrations in 1665. There is another work of his, published in his lifetime, on the 'Painting of the Antients,' which is a most useful book: but the work by which he is best known is a posthumous work, not printed indeed till 1743, entitled 'Etymologicum Anglicanum,' in which we have the investigation of the origin of numerous words in the English language, relics of the language spoken by our Saxon progenitors, conducted with an extraordinary apparatus of the knowledge required in such an undertaking. It was much used by Johnson.

Junius lived to his eighty-ninth year, dying in 1678, at Windsor, at the house of his nephew Isaac Vossius, another of the great names in the list of the really learned. He had formed a most valuable collection of manuscripts, which he bequeathed to the University of Oxford, and they are now among the treasures of the Bodleian Library.

JUNIUS'S LETTERS. [FRANCIS, SIR PHILIP.]

JUNO, a Roman divinity, whose attributes are nearly the same as those of the Grecian Hera. She was the daughter of Kronus and Rhea, the sister and wife of Jupiter, the goddess of marriage and childbirth, and the protectress of married women. Her worship was of very great antiquity at Argos and throughout the whole of the Peloponnesus. The Samians, as well as the Spartans, are supposed to have derived their knowledge of this deity from Argos (*Paus.*, iii. 13; vii. 4); and the same is said to have been the case with the inhabitants of Epidaurus, Ægina, and Byzantium (Müller's *Dorians*, i., p. 410, Eng. transl.). Her name also occurs in the early mythology of Corinth.

The two most celebrated temples of Juno were at Argos and Samos; the latter was the largest temple with which Herodotus was acquainted (*Herod.*, iii. 60). The Samians themselves denied that their knowledge of this deity was derived from Argos, and asserted that she was born in Samos. (*Paus.*, vii. 4.)

The marriage of Jupiter and Juno forms a prominent feature in the worship of this goddess. She was frequently represented veiled as a bride, and carried in processions, like a bride, on a car. Her favourite birds were the cuckoo and peacock.

She was worshipped at Rome with the epithets *Pronuba*, as presiding over marriage; *Lucina*, as bringing children to the light; and *Moneta*, as the warner, to whom a temple was erected on the spot where the house of Manlius Capitolinus stood (*Liv.*, vii. 28). The origin of the name *Moneta* is given by Cicero in his 'De Divinatione' (i. 45).

JUNO, the third in order of discovery of the small planets, discovered on the 1st of September, 1804, by Professor Harding, of Göttingen. This excellent astronomer, who died August 31, 1834, 'was of English extraction, and born at Lauenburg about the year 1763. He was originally educated for the Protestant Church; but having become tutor to the son of the illustrious Schröter, he was gradually attached to astronomy, and afterwards devoted himself exclusively to its practice and study. Having served for several years as assistant to Schröter, he became professor of astronomy in the university of Göttingen in 1805, and retained that chair till his demise, which catastrophe was hastened by excessive grief at the loss of his only child, a girl of fourteen years of age. The name of this amiable and active astronomer will be known through all ages as the discoverer of the planet Juno; and he compiled the most accurate celestial maps, especially of those parts where planets may be expected to appear, that are now extant.' (*Royal Astron. Soc. Annual Report* for 1835.)

It was while engaged in accurate and extensive observation of stars for the purpose, as it has been expressed, of forming a zodiac for the two new planets of Piazzi and Olbers, that Harding discovered the third; and this process gives the discovery a high degree of merit. [HERSCHEL.] The planet was, as in other cases, first supposed to be a star, until observation of it on two or three successive nights pointed out its motion. The planet itself is not visible to the naked eye, and it revolves round the sun in about 1593 days. [ASTRONOMY.]

Elements of Juno's Orbit.

Epoch 1842, May, 29^{d} 0^{h} mean astronomical time at Greenwich.

Semiaxis major 2·668947, that of the earth being assumed as the unit.

Excentricity 0·25581182.

Inclination of the orbit to the ecliptic 13° 2′ 20″·3.

Long. of ascending node	170°	56′	21″·7	From the mean equinox of the Epoch.
Long. of perihelion .	54	12	22 ·3	
Mean longitude . .	250	50	18 ·9	

Mean daily sidereal motion 813″·76167.

JU'PITER, the supreme Roman deity, known to the Greeks as Zeus, appears to have been originally an elemental divinity, who was worshipped as the god of rain, snow, lightning, &c. The etymology of the name, independent of other considerations, would lead us to this conclusion; since Jupiter was originally called Jov-is Pater, or Dies-piter, or Diu-piter, the *Diu* becoming softened in pronunciation into *Ju*, in the same manner as the Latin word *diurnus* has become *journal*. Jupiter, or Diupiter, would therefore mean the father of day or the air; the first part of the word contains the same root as the Latin adverb *diu* and adjective *diu-rnus*. This is also probably the original meaning of the Greek Ζεὺς and ΔιΓ-ὸς; though some have conjectured with considerable probability that Jov-is and Zeus are the same both in meaning and etymology as the Latin word deus. There is also a striking similarity, though probably accidental, between the word Jov-is and the Hebrew name of the supreme deity (יְהֹוָה). If there were any doubt respecting the original meaning of Ju-piter and Jov-is it would be sufficient to refer to those numerous passages in Latin authors in which the word is used in the signification of air (for example, Horace, *Od.* i., 1-25; Cicero, *De Nat. Deor.*, i. 15).

Cicero informs us (*De Nat. Deor.*, iii. 21) that there were three deities of the name of Jupiter: one the son of Æther; the second, the son of Heaven; and the third, the son of Saturn. The last was worshipped at Rome under various names, and many temples were erected to his honour, of which the most celebrated was the one on the Capitoline Hill, where he was worshipped under the name of Jupiter Optimus Maximus.

The Roman poets attributed to Jupiter the same power and attributes with which the Greeks invested Zeus. The Grecian Zeus was, according to Homer, the son of Kronus and Rhea. In order to save her son from being destroyed by his father, Rhea concealed him soon after his birth in a cave in Crete, where he passed the first years of his life.

As Zeus grew up, Kronos called to his aid the Titans, in order to secure his dominions against his son; but they were eventually conquered, and Saturn himself dethroned by the youthful Zeus. In the Homeric poems Zeus is represented as the supreme ruler of the heavens and the earth; and though subject himself to the degrees of fate, his commands cannot be disobeyed; his wisdom is infinite, and his power irresistible. His wife was Hera (Juno), and their children Hephæstus (Vulcan) and Ares (Mars). His worship was widely diffused throughout Greece.

Jupiter was usually represented as seated on an ivory throne, with a sceptre in his left hand and a thunderbolt in his right. The eagle, his favourite bird, was generally placed by the side of the throne.

JUPITER, the name of one of the old planets, the largest of all the bodies, except the sun, in the solar system. The astronomical history of this planet (or of any other, except the newly-discovered small planets) is so completely entangled in that of the progress of astronomy in general and pure mathematics, that it would be useless to attempt any separation. In the article GRAVITATION will be found the most remarkable points of what an astronomer would call the *theory* of Jupiter, meaning the explanation of his motions by means of the law of gravitation. We shall here confine ourselves to the statement of the elements of the planet's motion, and that of the satellites. [ASTRONOMY; GALILEO.] See also Baily's 'Astronomical Tables and Formulæ,' and Sir J. Herschel's 'Astronomy.'

The figure of Jupiter is sufficiently oblate to appear of a sensibly spheroidal form in a moderate telescope; the axis of revolution being to the equatorial diameter in the proportion of 167 to 177. The apparent equatorial diameter varies between half and three-quarters of a minute, being 36″·74, when the planet is at its mean distance from the earth. The real equatorial diameter is 10·86 times that of the earth, or upwards of 86,000 miles. It is nearly 1300 times as large as the earth, and its mean density is nearly the same as that of the sun, or about one quarter of that of the earth.

The mass of Jupiter, from the time of Newton to the present, was supposed to be to that of the sun in the proportion of 2 to 2141; but the recent observations of various astronomers, concluding with those of Mr. Airy contained in the late volumes of the Memoirs of the Astronomical Society, make it somewhat greater. Mr. Airy's result is that the mass of Jupiter is to that of the sun in the proportion of 1 to 1046·77, or 2 to 2094 nearly.

The planet revolves on its axis in $9^h\ 55^m\ 49^s·7$, and the inclination of its equator to the ecliptic is 3° 5′ 30″. Its light and heat are to those of the earth as 37 to 1000.

Elements of the Orbit of Jupiter.

Epoch 1799, December 31, 12^h mean astronomical time at Paris.

Semiaxis major 5·20115524, that of the earth being assumed as the unit.

Excentricity ·0481621; its secular increase (or increase in 100 years) ·0001594.

Inclination of the orbit to the ecliptic 1° 18′ 52″; its secular diminution 23″.

Longitudes from the mean equinox of the epoch (1.) of the ascending node 98° 25′ 44″·90; its secular increase (combined with the precession) 3430″; (2.) of the perihelion 11° 7′ 38″·26; its secular increase (combined with the precession) 5710″; (3.) of the planet (mean) 81° 52′ 19″·33.

Mean sidereal motion in 365¼ days 109256″·59; sidereal revolution 4332·5848212 mean solar days.

The four satellites of Jupiter appear to revolve on axes, each in the time of its revolution round the planet, in the same manner as our moon. The elements of their orbits are as follows (Baily, *Astron. Tables and Formulæ*): the units of time, length, and mass being the earth's mean solar day, the planet's equatorial semidiameter, and the planet's mass.

Sat.	Sideral Revolution.				Mean Distance.	Mass.
				More nearly.		
	d	h	m	d		
1	1	18	28	1·769137788148	6·04853	·0000173281
2	3	13	14	3·551810117849	9·62347	·0000232355
3	7	3	43	7·154552783970	15·35024	·0000884972
4	16	16	32	16·688769707084	26·99835	·0000426591

The first satellite has no sensible excentricity, and its orbit is very nearly indeed in the plane of Jupiter's equator. The second has no sensible excentricity; the inclination of its orbit to the planet's equator is under half a minute, and its nodes have a retrograde revolution of about thirty years. The third has a small but very variable excentricity, and the line of apsides has a direct but variable motion. The inclination of its orbit is under a quarter of a minute, and the nodes make a retrograde revolution in about 142 years. The fourth has a greater excentricity, and the direct mean motion of its apsides is nearly three-quarters of a degree per annum. The nodes made by its orbit with that of the planet have a direct motion of 4¾ minutes per annum, and the inclination of the orbit to that of Jupiter is 3° nearly. Sir J. Herschel gives as the mean apparent diameter of the planet and satellites 38″·327, 1″·105, 0′·911, 1″·488, and 1″·273; and as the diameter in miles, 87,000, 2508, 2068, 3377, 2890.

In consequence of the smallness of the angle by which Jupiter's equator is inclined to the ecliptic, and of the nearness of the orbits of the satellites to the plane of the equator, all the satellites, except the fourth, which sometimes escapes, undergo one eclipse once in every revolution. Since [ECLIPSE] this is caused by the entry of the satellite into Jupiter's shadow, the eclipse is independent of the earth's position, and the observation can certainly be made, unless Jupiter be too near to the sun. It is found that an immersion or emersion is not visible, generally speaking, unless Jupiter be as much as 8° above the horizon, and the sun as much as 8° below it. It never happens that both the immersion and emersion can be observed, in the case of the first satellite, and rarely in that of the second; though it is otherwise with the third and fourth. The reason is, that the planet itself always hides a part of its own shadow, and the first satellite is so near the planet that it must either enter or leave the shadow behind the planet: which also happens, for the most part, in the case of the second satellite. Before the planet is in opposition its shadow is on the western side of the planet, and after opposition on the eastern; while before the opposition immersions only are visible, and after opposition emersions, in the case of the first and second satellites. The eclipses of the four several satellites last about 2¼, 2¾, 3½, and 4¼ hours, one time with another. For the use of these eclipses in determining LONGITUDE, see that word.

When Jupiter is in or very near opposition, the planet itself hides its own shadow entirely, so that both immersion into and emersion out of the shadow may be invisible from the interposition of the planet; so that we then have the eclipse of an eclipse. And when the satellite passes between the sun and the planet, its shadow may throw a spot on the planet into darkness, which spot will appear to pass over the disc of the planet. Lastly, a satellite may pass between the planet and the earth, in which case it is seen sometimes as a bright and sometimes as a dark spot. The times of all these appearances are predicted in the Nautical Almanac.

JURA, an island of the Hebrides, in the district of Isla and shire of Argyle, bounded on the east by the Sound of Jura, and on the west by that of Isla. Its greatest length is less than thirty miles, and its average width about seven miles, being comprised between the latitudes of 55° 50′ and 56° 10′ north, and between the longitudes 5° 45′ and 6° 5′ west. The island is a continuous mountain range, elevated towards the south into five distinct points, of which the three principal are called the Paps, and rise to the height of 1083 feet. The flat land lies wholly on the eastern side of the island, and is estimated at less than one-twentieth of the entire surface: the rest consists of tracts of mountain pasture, intersected by many mountain torrents, and scarcely inhabited. Besides the great inlet of Loch Tarbet, the coast line is indented with several bays and harbours, the chief of which are Small Isles and Lowlandman's Bay. On the western shore are found large quantities of fine sand, which is much in request in the manufacture of glass. Large flocks of sheep and goats are fed upon the mountains, where also may be seen occasionally red deer, grouse, and other game. This island, with those of Collonsay, Scarba, Oronsay, and five other isles, constitute the parish of Jura, which, in 1831, contained 1312 inhabitants, the greater part of whom were employed in fishing. (MacCulloch's *Highlands*; *Beauties of Scotland*; *Population Returns*, &c.)

JURA, a department in the eastern part of France, on the frontier toward Switzerland. It is bounded on the north by the department of Haute Saône; on the north-east by that of Doubs; on the east by Switzerland; on the south by the department of Ain; on the west by that of Saône et Loire; and on the north-west by that of Côte d'Or. The greatest length is from north to south, from the bank of the Oignon near its junction with the Saône, to that of the Ain at the junction of the Valoux, 72 miles; its greatest breadth, at right angles to the length, is from the bank of the Seille, where it touches the frontier, to the neighbourhood of Nozeroy, about 41 miles. The area of the department is estimated at 252 square French leagues, or 1927 square English miles, rather greater than that of the English county of Northumberland. The population by the census of 1831 was 312,504, by that of 1836, 315,355, showing an increase in five years of 2851; and giving (in 1836) 164 inhabitants to a square mile. In density of population the department is just equal to the average of France, and superior to the English county with which we have compared it. Lons-le-Saunier, the chief town, is in 46° 40′ N. lat. and 5° 33′ E. long., 214 miles in a straight line south-east of Paris, or 241 miles by Provins, Troyes, Dijon, and Dôle.

The southern and eastern parts of the department are mountainous; the northern and western are more level. The Jura Mountains traverse the department and form three ridges of different elevations running from north-east to south-west. The loftiest summits, lying along the Swiss frontier, have an average elevation of nearly 4000 feet, and are covered with snow six months in the year: they present no soil capable of cultivation. The second ridge, covered for the most part with forests and thickets of pine, juniper, and box, has some fertile valleys and pasture grounds. The lowest ridge is covered with soil everywhere of good quality, and increasing in depth and fertility as it approaches the plain, which occupies the rest of the department.

The department belongs entirely to the basin of the Rhône: and the principal streams are the Oignon, the Doubs, and the Seille, affluents of the Saône, which joins the Rhône at Lyon; and the Ain, which falls into the Rhône several miles above that city. The Oignon flows for a few miles along the northern boundary of the department, which it separates from that of Haute Saône. The Doubs flows through the northern part of the department in a south-west direction past Dôle.

The Seille, which rises in the lower slopes of the Jura, near the centre of the department, waters the western side. The Ain rises just in the southern part of the department amid the heights of the Jura, not far from St. Claude, and flows first north, then west, and then south into the department of Ain. None of the rivers of the department are navigable except the Ain for about seven or eight miles. There is one canal, that which unites the Rhône and the Rhine, about 25 miles of which are in the department. It passes from the Saône to the valley of the Doubs near Dôle, and follows the course of that valley into the department of Doubs.

The principal road in the department is that from Paris by Dijon to Geneva. It enters the department on the north side between Auxonne (dep. of Côte d'Or) and Dôle, passes through Dôle, Mont-sous-Vaudrey, Poligny, Montrond, Champagnole, Maison Neuve, St. Laurent, Morey, Les Rousses, and La Valtay: between these last two towns it crosses a part of Switzerland, and beyond La Valtay enters the department of Ain. A branch of this road runs to Lons-le-Saunier, and rejoins the high road at St. Laurent; other branches lead to Arbois and Salins; roads lead from Dôle and Lons-le-Saunier to other towns in this and the neighbouring departments. The aggregate length of the government roads is 206 miles, of which about two-thirds are out of repair, and one-sixth unfinished, leaving only one-sixth in a fit state for use. The Routes Départementales have an aggregate length of 338 miles, all, except seven miles of unfinished road, in good repair. The bye-roads and paths have an aggregate length of nearly 3600 miles. The department would be rather better furnished with roads than the average of the departments, if they were kept in proper repair.

The north-western portion of the department is occupied by the strata above the chalk; the rest of the department by the strata between the chalk and the new red or saliferous sandstone: the chalk formation itself does not appear to occupy any part of the surface. (*Carte Physique et Minéralogique de France; Atlas to* Malte Brun's *Précis de Géographie.*) The mineral treasures of the department are considerable. Many iron-mines are worked; lead and coal are found, but not worked, and there are some traces of gold. Various species of marble of great variety and beauty, and alabaster, are quarried; also lithographic stones. Peat is dug; and there are several brine springs the water of the springs of Salins yields 15 per cent. in weight of salt.

The climate of the department varies materially in different parts, according to the elevation of the surface. In general the winters are long, owing to the snow which remains on the mountains till April; and the temperature, even in the plains, is colder than the latitude would lead one to expect. The spring is short, and the summer hot; the air, which in the plain is moist and close, is fresh and pure on the lower slopes, and dry and keen in the higher ridges, where the seasons are reduced to two, a winter of eight months and a summer of four.

The agricultural produce is sufficient for the consumption of the department. The harvests in the plain are very abundant, and consist of wheat, rye, buckwheat, and maize. On the lower hills they consist of barley, oats, maize; rape seed is also grown here. In the higher ridges of the mountains, where there is any cultivation, the crops are very scanty; some barley and oats, and, in favourable spots, a little wheat and hemp, are grown. The vine is cultivated on the lower slopes of the mountains, and the quantity of wine produced is greater than the consumption. It is chiefly white wine, and is of good quality; that of Arbois is creaming and sparkling, like champagne. The walnut is raised on the lower hills. The quantity of woodland is considerable: the principal forests are that of Chaux, in the northern part of the department, between the Oignon and the Loue; and the contiguous forests of Moydon, Arbois, and Poligny, in the centre of the department. The trees are chiefly the pine and the oak.

The quantity of horned cattle is great, especially of cows. The butter is very good, and much cheese is made. The number of sheep is comparatively small: the long-woolled English sheep have however been lately introduced, and with good success. Horses are tolerably numerous, and some mules are bred. Poultry and bees are objects of considerable attention, especially bees in the mountain country, where they yield excellent honey. The forests yield game and wild animals, including the wild boar, the wolf, the fallow-deer, and a few roebucks; and the rivers and lakes abound with fish, especially excellent crayfish.

The department is divided into four arrondissements, as follows:—

Arrondissement.	Situation.	Area in sq miles.	Population in 1836.	Communes
Lons-le-Saunier	W. & S.W.	596	107,690	207
Poligny . . .	E.	482	80,672	149
St. Claude . .	S.E.	405	52,353	82
Dôle . . .	N.	444	74,640	137
		1927	315,355	575

It is divided into thirty-two cantons, or districts under a justice of the peace.

In the arrondissement of Lons-le-Saunier are Lons-le-Saunier on the Vaille (population in 1836, 7684); Orgelet, near the Valouze (pop. 1928 town, 2367 whole commune), St. Amour, in the south-western corner of the department (pop. 1957 town, 2595 whole commune), Scellières, on the Brene, a feeder of the Seille; Bletterand, Arlay, and Château Châlon, on or near the Seille; Conliege on the Vaille; Clairvaux, on the Drouene, a feeder of the Ain; Cousance, on a small affluent of the Solnan, a tributary of the Seille belonging to the adjacent department of Saône and Loire; Gigny and St. Julien, on the Suran, a feeder of the Ain; and Arinthaux, or Arinthod, near the Valouse.

Lons-le-Saunier, the capital of the department, took its rise in the fourth century from the salt-works, which are still of great importance. It is situated at the confluence of three small streams in a fertile valley, surrounded by vineyards. The principal buildings are the church on the parade, a fine hospital, capable of accommodating a hundred and fifty patients, and the salt-works. There are neat fountains, a library, a museum, a high-school, a theatre, and an agricultural society. Lons-le-Saunier is one of the chief places

of trade in the department: a considerable quantity of paper, card-board, leather, cheese, and iron is manufactured in the town or neighbourhood. At St. Amour several festivals and usages, which may be traced to the remotest antiquity, are still observed. Arinthaux is built on the site of an antient Gaulish temple. Clairvaux was formerly celebrated for its abbey. [CLAIRVAUX.] In its neighbourhood are considerable iron-works, where nails are manufactured by machinery.

In the arrondissement of Poligny are, Poligny, on the Glantine (population, in 1836, 6492), Arbois, near the source of the Vieille, a small affluent of the Cuisance (pop. 6464 town, 6741 whole commune), Salins, on the Furieuse (pop. 5759 town, 6554 whole commune), and Nozeroy, on a small feeder of the Ain.

Poligny appears to have been a place of some note in the latter period of the Roman empire, and is perhaps the Castrum-Olinum of the Notitia Imperii, the residence of the Roman governor of the province of Maxima Sequanorum. Poligny was the summer residence of the dukes of Bourgogne. This town is regularly laid out, and is adorned with several fountains, which contribute to the cleanliness of the place. The inhabitants manufacture hosiery, nails, earthenware, and turnery wares in wood and metal. The environs of the town are rich in monuments of antiquity: among them are two druidical stones, which the superstition of the surrounding peasantry still supposes to revolve on their centres at the yearly celebration of the midnight mass. There are the remains of vast Roman buildings, the purpose of which is unknown. Arbois is a handsome town, the inhabitants of which manufacture paper and porcelain. The town has many relics of Gaulish and Roman buildings, and the ruins of an antient castle of the middle ages. Large quantities of vegetables and flowers are grown round Arbois. The wine has been noticed already. It was the birthplace of Pichegru. Salins owes its name and prosperity to its brine springs, which were well known as early as the sixth century. This town was almost entirely destroyed by fire in A.D. 1825. The hospital, the high-school, and the salt-works were almost the only buildings that escaped destruction, except in the suburbs, which were not injured. The loss in houses and furniture was estimated at 300,000*l.* Subscriptions were opened all over France, and above 80,000*l.* was promptly subscribed: the inhabitants energetically betook themselves to the rebuilding of the town; by day they worked at clearing away the ruins, and at night they assembled in one of the rooms of the high-school to receive instructions from a fellow-townsman, a soldier who had been educated in the Polytechnic school at Paris, in those principles of geometrical and mechanical science which would enable them to rebuild their houses in the easiest and most economical manner. Salins was rebuilt; a wide street, with a foot-pavement, an unusual thing in France, extends the whole length of the town, and there are fountains in the open spaces, of simple construction, but in good taste. The houses are well built. Salins is walled and defended by two forts, Fort St. André and Fort Belin.

In the arrondissement of St. Claude are St. Claude, on the Bienne (pop. in 1836, 5238), Moyrans, near the Ain, and Morez, near the Bienne, on a torrent called the Bief de la Chaille, which flows into that river. St. Claude is described elsewhere. [CLAUDE, ST.] Morez is in a long defile of the Jura, so narrow as barely to allow the requisite width for the street and the houses that skirt it on each side, behind which the mountains rise almost perpendicularly to the height of 1200 feet. Brass-wire, pins, clocks, watches, and roasting-jacks are made here.

In the arrondissement of Dôle are Dôle (pop. in 1836, 10,137), and Rochefort, on the Doubs; and Chaussin on the Dorain. Dôle is described elsewhere. [DÔLE.] The other two towns are unimportant.

The manufactures of the department are carried on with great activity. There are several iron-works. Wrought and cast iron and steel are manufactured: nails and heavy iron goods are made. Clocks and watches, spectacle-frames, and roasting jacks are made at Morez, at Foncine le Haut, and Foncine le Bas, in the arrondissement of Poligny. In the arrondissement of St. Claude, turnery wares, and toys in ivory, bone, box, and other woods, horn, &c. are made. At Sept Moncel, in the same arrondissement, five hundred persons are engaged in the manufacture of artificial gems. The other manufactures of the department are cotton stockings, hats, coarse linens, chamois and other leather, paper, brandy, glue, mineral acids, soap, &c. The chief exports consist of the above-mentioned articles, especially iron goods, toys, and watches; wine, timber, and deals; horses for the cavalry, and horned cattle. A number of the inhabitants emigrate yearly to other parts of France, and follow the calling of lime-burners, plasterers, hemp-dressers, and curriers; returning home at the time of harvest.

This department forms the diocese of St. Claude, the bishop of which is a suffragan of the archbishop of Lyon et Vienne; it is in the jurisdiction of the Cour Royale, and the circuit of the Académie Universitaire of Besançon, and is comprehended in the sixth military division, of which the head-quarters are at Besançon. It returns four members to the Chamber of Deputies.

In respect of education this department is the third in France. Of the young men enrolled in the military census of 1828-29, seventy-three in every hundred could read and write.

This department formed part of the territory of the Sequani, one of the principal nations of the great Celtic stock. Under the Roman dominion it made part of the province of Maxima Sequanorum, a subdivision of Gallia Lugdunensis, or Celtica. It subsequently passed into the hands of the Burgundians and the Franks; and in the middle ages made part of the province of the county of Bourgogne, or Franche Comte. [BOURGOGNE; BURGUNDIANS; FRANCE, FRANCHE COMPTE.]

JURA MOUNTAINS. The range of elevated ground to which this name peculiarly applies lies to the west of the Lakes of Geneva and Neufchâtel, and may be described as a broad limestone ridge, swelling at several points to more than 5000 feet above the sea. The Mont Dôle, north-west of Geneva, is about 5500 feet, and the Mont Reculet, west of Geneva, is still higher. If to this region we give the name of the 'Swiss Jura,' the continuation of the same limestone country though Suabia and Franconia will be properly distinguished as the 'German Jura,' rising in the Rauhe Alp, near Ulm, to 2400 feet above the sea. The general direction of these calcareous mountains is north-eastward, but in Franconia it changes to a northward course; their boundaries are little sinuous; their breadth averages about 20 miles, and from the vicinity of Bamberg to the passage of the Rhone the length exceeds 400 miles. In a south-westward direction similar limestone rocks extend to the vicinity of Narbonne, about 140 miles farther, making the whole range of the Jura and its physically related rocks about 550 miles.

Nearly parallel to the Swiss and German Jura on the south, calcareous rocks, belonging to the same geological æra, range in front of the primary rocks of the Alps, from Chambery to Vienna, more than 500 miles; and similar ranges of the same strata occupy the right side of the Saône and the left of the Meurthe and Moselle, and connect themselves with the oolites which encircle the basin of Paris. Thus the Helvetic Jura occupies a nearly central position with respect to an immense and ramified system of elevated limestone districts, all belonging to one geological system; and hence it has become the almost universal practice of the continental geologists to designate that series of rocks by the title of the 'Jura formation,' which corresponds exactly to the 'oolitic system' of our general table. [GEOLOGY.]

The mountains of the German, Swiss, and French Jura, regarded in a general point of view, may be described as enclosing between their ranges an immense basin, which contains the greater portion of Burgundy and Lorraine, the whole of Alsace, Suabia, Franconia, and Hesse. Against this enclosed region the oolitic ranges present bold and abrupt descents, while toward the exterior the slopes are gentle. The chalk formation partially surrounds the Jura ranges on the French and German sides, but in the interior of the basin not a trace of it is to be found, and Von Buch believes that the Jura Mountains stood up amid the waters of the sea at the time of the deposition of the cretaceous system of rocks, nearly as we may suppose the coral reef of New Holland would appear if elevated by subterranean forces. (*Verhandlungen der Königl. Akademie der Wissenschaften zu Berlin*, 1838.) M. Boué had previously recognised the antiquity of the elevation of the German Jura, in discussing the characters of the Bavarian tertiary region. (*Proceedings of the Geological Society of London*, 1830.) And M. E. de Beaumont, from a general contem-

plation of the phenomena on the line of the Jura Mountains, adopted the conclusion that from the Cevennes through the Swiss and German Jura, perhaps even to the Erzgebirge, dislocations of considerable importance occurred, ranging north-east and south-west, after the deposition of the oolites and before the deposition of the chalk. (*Sur les Révolutions du Globe, in Annales des Sciences Naturelles*, 1827.)

Von Buch observes that the Swiss, Suabian, and Franconian divisions of the Jura Mountains have each their peculiar characters. In the Swiss Jura the strata are thrown up at high angles of elevation, and consequently form long extended ridges and chains; the Suabian region is formed of rocks which lie in regular and nearly horizontal layers, and constitute an extended and uniform plateau; in Franconia dolomite abounds, and crowns the heights with picturesque rocks, resembling the towers and pinnacles of ruined castles. The mineral composition of the Jura ranges is everywhere similar; and, when minutely analyzed, may be considered as forming a series of terms severally comparable to the larger divisions of the oolitic series of England and Normandy.

According to M. Thurman, 1832 (De la Beche's *Manual*), the central part of the Jura (at Porentruy) contains—

Fine oolites and compact limestones, equivalent to the 'Portland oolite.'
Marls and marly limestones, equivalent to 'Kimmeridge clay.'
Compact oolitic and coralline limestones, equivalent to the 'Oxford oolite,' &c.
Marly and sandy limestones, equivalent to the 'calcareous grit.'
Blue marls, limestones, ferruginous oolite, equivalent to 'Oxford clay.'
Oolitic shelly limestones, sandy limestones and marls, equivalent to the 'Cornbrash and forest marble' groups.
Fine-grained oolite, equivalent to the 'Bath great oolite.'
Marls and calcareous beds, equivalent to the 'Fullers' earth.'
Oolite, partly ferruginous, equivalent to the 'inferior oolite.'
Micaceous sandstones and marls, equivalent to the 'sand below inferior oolite.'
Lias.

This coincides very nearly with M. Thirria's notice of the series in Haute Saône.

According to M. Boué (1830), the German Jura contains the subdivisions of the oolitic series from the lias upward to the cornbrash. He thus includes in the Bath oolitic formation [GEOLOGY] the dolomitic limestones of Franconia, and the lithographic slates of Solonhofen, even more celebrated for their numerous tortoises, Pterodactyli, fishes, crustacea, ammonites, belemnites, insects, algæ, and other fossils, than the supposed equivalent beds of Stonesfield.

On these points M. Boué appears to be supported by Mr. Murchison (*Geol. Proceedings*, 1831); Von Buch regards the dolomites and lithographic slates as constituting a distinct upper band of the 'Jura formation' (corresponding to the Oxford and Portland oolites), and some of the highest layers of this group, full of Diceras and Nerinea (as in Haute Saône), have been recently followed by him over the whole northern inclination of the Suabian Jura. ('Verhandlungen der Königl. Akad. der Wissenschaften zu Berlin.')

Von Dechen's opinion on this subject appears to coincide with that of Von Buch; and the researches of Count Munster and Goldfuss on the organic remains may be quoted in confirmation of the view that the German Jura, like that of the Swiss frontier, contains the equivalents, more or less developed, of the whole English oolitic series; and we are encouraged to hope that a careful comparison of the limestone ranges which border the Alps and extend into Dalmatia will determine, more exactly than we now know, the relation which they bear to the 'Jura formation' of the rest of Europe.

The determination of the geological epoch of the elevation of the Jura ranges to constitute dry land is important, especially in reference to two phenomena which are witnessed in these mountains, viz. the ossiferous caverns of Franconia, and the dispersion of erratic blocks from the High Alps. The opinion of John Hunter (Dr. Travers's *Oration to the College of Surgeons*, 1838), that the caverns of the district of Muggendorf were filled by bears which voluntarily retired thither, has been confirmed by subsequent researches. (Buckland, *Reliquiæ Diluvianæ;* and Von Meyer, *Palæologica*.) But the geological æra of their existence is perhaps subsequent to the whole tertiary period, while Von Buch's view of the origin of the Jurassic limestones seems to imply their prominence as islands in the antient European sea before the deposition of the chalk. If this opinion be well founded, the problem of the dispersion of the erratic blocks from the High Alps, which has so long perplexed geology, is still involved in undiminished difficulty. These blocks lie in vast abundance on the south-eastern slopes of the Jura, and ascend towards their summits, even to the height of 1000 or 2000 feet above the Aar and the Lake of Geneva, which now interpose their waters between the Jura and the mountains whence the blocks were drifted.

These blocks lie in such a manner that ordinarily those which came from a particular district are distinct from the others, and seem to have been brought by a distinct channel. Blocks from the Grisons have descended the valley of the Rhine; those found on the shores of the Lake of Zürich and in the drainage of the Limmat are derived from the mountains of Glarus; while in the valley of the Aar and on the slopes of the Jura lie fragments from the Bernese Alps. They occur in greatest abundance opposite the mouths of the great valleys which descend from the High Alps; at such points they have been drifted farthest up the slopes of the Jura, in some cases even to 1200 metres (1300 yards) above the sea. They exhibit few or no marks of rolling.

To account for these facts, numerous speculations have been proposed. De Luc imagined a projectile force to have displaced the blocks when the Alps were raised; Saussure, Escher, Von Buch, De Beaumont, &c. speak of the effects of water thrown into violent agitation (as some think by the elevation of the mountains); Dolomieu attributed the inequalities of surface, which render the physical explanation of the phenomena by the ordinary agencies of nature almost desperate, to operations subsequent to the scattering of the blocks; Venturi introduced the consideration of floating ice-rafts, since become popular; while others have attempted to master the difficulty of the problem by admitting great changes of level since the blocks were moved from their native sites.

According to this view, the erratic blocks of the Jura were accumulated round the Alps by the ordinary or extraordinary action of water-currents in antient Alpine valleys, on surfaces which were at a later period lifted to their present height by subterranean movements. (Brongniart, *Tableau des Terrains*.) [ERRATIC BLOCKS.]

JURA KALK, the German equivalent of the oolitic system of England.

JURISPRUDENCE. The Latin word *prudentia* (contracted from *providentia*) came, by a natural transition, to mean *knowledge* or *understanding*. 'Habebat (says Nepos, *Life of Cimon*, c. 2) magnam prudentiam tum juris civilis tum rei militaris:' hence persons skilled in the Roman law were called *juris prudentes*, or simply *prudentes;* in the same manner that they were called *consulti*, as well as *juris consulti*. (Haubold's *Lineamenta Instit. Juris Romani*, lib. iv., cap. 5; Hugo, *Geschichte des Römischen Rechts*, p. 458, ed. xi.) A large part of the Roman law was gradually adopted by the legislature and the judices from the writings of the jurists: the emperors moreover sometimes appointed persons whose opinions (or *responsa*) the judex was bound to follow. (*Dig.*, lib. i., tit. 2., No. 2, s. 5-7, 35-47; *Inst.*, lib. i., tit. 2, s. 8.) According to the acceptation of the term *prudens* or *juris prudens* in the Roman law, *juris prudentia* is sometimes limited to the dexterity of a practical lawyer in applying rules of law to individual cases; whence the technical use of the term *jurisprudence* in the French legal language for law founded on judicial decisions, or on the writings of jurists.

By *general jurisprudence* is properly meant the science or philosophy of positive law, as distinguished from *particular jurisprudence*, or the knowledge of the law of a determinate nation. 'General jurisprudence, or the philosophy of positive law, is not concerned directly with the science of legislation: it is concerned directly with principles and distinctions which are common to various systems of particular and positive law, and which each of those various systems inevitably involves, let it be worthy of praise or blame, or let it accord or not with an assumed measure or test.

General jurisprudence is concerned with law as it necessarily is, rather than with law as it ought to be; with law as it must be, be it good or bad, rather than with law as it must be, if it be good.' (Austin's *Outline of a Course of Lectures on General Jurisprudence*, p. 3.) For example, every system of positive law must involve such notions as sovereignty, legal right, legal duty, legal sanction, civil or criminal injury, the grounds of imputation or legal guilt, and of non-imputation or legal innocence, property, possession, &c., which therefore belong to the province of general jurisprudence. [LAW; LEGISLATION.]

A systematic treatise on general jurisprudence does not fall within the scope of this Cyclopædia. A detailed, precise, and lucid description of the province of general jurisprudence will be found in Mr. Austin's work on the subject (8vo., London, 1832), and the annexed outline of a course of lectures. (*Journal of Education*, No. 8, p. 285.) Bentham's 'Traités de Législation' also contain much valuable matter relating to this subject. A list of works on general jurisprudence may be seen in Krug's 'Philosophisches Lexicon,' in the article *Rechtslehre.*

JURY (in English law) is a term of art denoting an assembly of men authorized to inquire into or to determine facts, and bound in both cases by an oath to the faithful discharge of their duty. The etymological derivation of the term is obviously from *juro*, to swear, whence we find this institution called in forensic Latin *jurata*, and the persons composing it *jurati*; in French *les jurés*, and in English *the jury*. In English law, when the object is inquiry only, the tribunal is sometimes called an inquest or inquisition, as in the instance of a grand jury or coroner's inquest; but when facts are to be determined by it for judicial purposes, it is always styled a jury. When the trial by jury is spoken of in popular language at the present day, it signifies the determination of facts in the administration of civil or criminal justice by twelve men sworn to decide facts truly according to the evidence produced before them.

Inquiry into facts on behalf of the crown by means of juries was frequent in England long before the trial by jury was commonly used in courts of justice for judicial purposes. Thus we find, immediately after the Conquest, inquisitions *ad quod damnum* (which antiently took place in all grants by the crown, though now of more limited use): inquisitions *post mortem*, which were instituted on the death of the king's tenants, to ascertain of what lands they died seised; inquisitions of lunacy (*de lunatico inquirendo*); and several other inquests, which were called inquests of office, and took place where the crown was concerned in interest: all of these inquiries were made by means of juries of the neighbourhood, who were presumed to be necessarily conversant with the facts. So in England also in the reign of John, when the lands of the Normans were seised into the hands of the king, inquisitions by jury were executed in each county to ascertain their value and incidents. (See the forms of these inquests in Hardy's *Rotuli Normanniæ*, vol. i., p. 122.)

Besides these juries of inquiry (*inquisitoria jurata*), there were accusatory juries (*jurata delatoria*), who presented offences committed within their district or hundred to the king or his commissioned justices. These inquests were immediately connected with the administration of justice, their duty being to charge offenders, who, upon such accusation, were put upon their trial before judges, and were afterwards condemned or 'delivered' by them according to the result of the trial. Though the character, incidents, and duties of these accusatory juries in early times are involved in much obscurity, there is little doubt that they formed the origin of our present grand juries.

The number of persons composing juries of inquiry and accusatory juries was arbitrary, and might consist of more or occasionally of fewer than twelve men.

The third species of jury is the institution by which disputed facts are to be decided for judicial purposes in the administration of civil or criminal justice, and which is in modern times familiar to us under the denomination of *trial by jury*. Dr. Pettingall, in a Tract published in 1769, expresses a confident opinion that juries of this description are the same functionaries as the dicastæ (δικασταί) of the Athenians and the judices of the Romans, and maintains that our trial by jury was derived immediately from Rome, and ultimately from Greece. No doubt the similarity of several of the incidents enumerated in this curious tract are remarkable [JUDEX, JUDICIUM]; but it seems more probable that they are rather to be ascribed to the accidental resemblance of popular institutions for the administration of justice in different countries than to identity of origin. The precise time at which this species of trial originated in England has been the subject of much animated discussion; and in particular the question whether it was known to the Anglo-Saxons, or was introduced by the Conqueror, has been warmly debated. Coke and Spelman, among earlier legal antiquaries, and, in later times, Nicholson (*Preface* to Wilkins's *Anglo-Saxon Laws*, p. 9), Blackstone (*Commentaries*, book iii., c. 22), and Turner (*History of Anglo-Saxons*, vol. iv., book xi., cap. 9), maintain with much confidence the existence of this institution before the Conquest. On the other hand, Hickes (*Dissert. Epist.*, p. 34), Reeves (*History of the English Law*, vol. i., p. 24), and several other learned writers, contend that it was introduced by the Conqueror, or at least that it was derived from the Normans, and was not of Anglo-Saxon origin. The latter opinion is adopted by Sir Francis Palgrave, in his *History of the English Commonwealth*, vol. i., p. 243.

Without entering minutely into this controversy, it may be stated that the traces of the trial by jury, in the form in which it existed for several centuries after the Conquest, are more distinctly discernible in the antient customs of Normandy than in the few and scanty fragments of Anglo-Saxon laws which have descended to our time. The trial by 12 compurgators, which was of canonical origin and was known to the Anglo-Saxons and also to many foreign nations, resembled the trial by jury only in the number of persons sworn; and no conclusion can be drawn from this circumstance, as 12 was not only the common number throughout Europe for canonical and other purgations, but was the favourite number in every branch of the polity and jurisprudence of the Gothic nations; *Purget se duodecimâ manu vel duodecim sacramentalibus* was a common phrase. (See Spelman's *Gloss.*, tit. *Jurata*; also *Edinburgh Review*, vol. xxxi. p. 115.) For this reason Mr. Hallam justly observes (*Middle Ages*, vol. ii., p. 401) that in searching for the origin of trial by jury, 'we cannot rely for a moment upon any analogy which the mere number affords.' Besides this, the trial by compurgators under the name of Wager of Law continued to be the law of England until it was abolished, in 1833, by the statute 3 and 4 Will. IV., c. 42, s. 13, and is treated by all writers and noticed in judicial records ever since the Conquest as a totally different institution from the trial by jury. The trial *per sectatores* or *per pares* in the county court, which has sometimes been confounded with the trial by jury, was in truth a totally different tribunal. The sectatores or pares were, together with the sheriff or other president, judges of the court,—as are the suitors in the county courts at the present day; and it appears to have been the common course with the Gothic nations that twelve assessors should be present with the king or judge to decide judicial controversies. (Du Cange, *Gloss*., ad vocem *Pares*.) The *pares curiæ* resembled permanent assessors of the court, like the *scabini* mentioned in the early laws of France and Italy, much more nearly than sworn jurors indiscriminately selected, and performing a subordinate part to the judge. On the other hand, the incidents of the mode of trial prevalent in Normandy long before the Conquest correspond in a striking manner with those of our trial by jury as it existed for centuries afterwards. Thus in Normandy offenders were convicted or absolved by an inquest of good and lawful men summoned from the neighbourhood where the offence was surmised to have been committed. The law required that those were to be selected to serve on such inquest who were best informed of the truth of the matter; and friends, enemies, and near relatives of the accused were to be excluded. So also in the Norman Writ of Right, those were to be sworn as recognitors who were born and had even dwelt in the neighbourhood where the land in question lay, in order that it might be believed that they knew of the truth of the matter and would speak the truth respecting it. (*Grand Coustumier*, cap. 68, 69, 103.) These incidents, though unlike our present mode of trial (which, as will presently be shown, has entirely altered its character within the last four centuries), are nearly identical with the trial by jury as it is described first by Glanville and afterwards by Bracton, and correspond almost verbally with the form of the jury process, which has continued the same from very early times to the present day; by which the sheriff is commanded to return 'good and lawful men of the neighbourhood, by whom the truth of the matter may be better known, and who are not

akin to either party, to recognize upon their oaths, &c.' On the other hand (as Madox remarks, in his *History of the Exchequer*, p. 122), 'if we compare the laws of the Anglo-Saxon kings with the forms of law process collected by Glanville, they are as different from one another as the laws of two several nations.'

Though there are some traces of the trial by jury in the four reigns which immediately succeeded the Norman Conquest, it was not till a century afterwards, in the reign of Henry II., that this institution became fully established and was reduced to a regular system. Its introduction into frequent use at this period was probably owing to the law or ordinance for the trial by assize in pleas of land or real actions, made by Henry II. This law has not come down to our times, but it is fully described by Glanville (lib. ii. cap. 7), and the greater part of the treatise of that writer is occupied by an account of the practical machinery of the trial by twelve men which he warmly eulogises and represents as having been introduced in opposition to the unsatisfactory mode of trial by battle or duel. In the reign of Henry II. it appears also that a jury was sometimes used in matters of a criminal nature—the proceeding in such cases being noticed as an inquiry *per juratam patriæ vel vicineti*, or *per juramentum legalium hominum*. Thus in the 'Constitutions of Clarendon,' enacted in 1164, it is directed that 'if no person appeared to accuse an offender before the archdeacon, the sheriff should, if requested to do so by the bishop, cause twelve lawful men of the neighbourhood or of the township to be sworn, who might declare the truth according to their conscience.' These however were probably accusatory juries, similar to our grand inquests, and not juries employed for the actual trial or 'deliverance' of criminals, which do not seem to have been commonly used until a later period.

The law of Henry II. introduced the trial by assize or jury in real actions as a mode of deciding facts which the subject might claim as a matter of right. Glanville calls it 'a certain royal benefit conferred upon the people by the clemency of the sovereign with the advice of the nobility.' Accordingly we find in the *Rotuli Curiæ Regis* in the time of Richard I. and John, many instances of trials by jury being claimed by parties, though it appears from these curious records that at this period the trial by battle was still in frequent use. In the reign of John we first begin to trace the use of juries for the trial of criminal accusations. At first it seems to have been procured by the accused as a special favour from the crown, a fine, or some gift, or consideration being paid in order to purchase the privilege of a trial by a jury. Several instances of this kind will be found collected in the Notes and Illustrations to Palgrave's *Commonwealth of England*, vol. ii., p. 186. The payment of a fine took place also not unfrequently in civil cases where any variation from the regular course was required; see *Rotuli Curiæ Regis*, vol. i., pp. 354, 375; vol. ii.. pp. 72, 92, 97, 101, 114. It is quite clear, however, from Bracton and Fleta, that at the end of the thirteenth century the trial by jury in criminal cases had become usual, the form of the proceedings being given by them in detail. (See Bracton, p. 143.) Introduced originally as a matter of favour and indulgence, it gained ground with advancing civilization, gradually superseding the more antient and barbarous customs of battle, ordeal, and wager of law, until at length it became, both in civil and criminal cases, the ordinary mode of determining facts for judicial purposes.

It is right to notice the popular and remarkable error that the stipulation for the *judicium parium* in Magna Charta referred to the trial by jury. Sir Edward Coke in his commentary upon Magna Charta expressly distinguishes between the trial by peers and the trial by jury (2nd Inst. 48-9); but Blackstone says, 'The trial by jury is that trial by the peers of every Englishman, which, as the grand bulwark of his liberties, is secured to him by the Great Charter.' (*Commentaries*, vol. iv., p. 349.) This is confounding two distinct modes of trial. The *judicium parium* was the feudal mode of trial, where the *pares* or *convassalli ejusdem domini* sat as judges or assessors with the lord of the fee to decide controversies arising between individual *pares*. It was a phrase perfectly understood at the period of Magna Charta, and the mode of trial had been in use long before in France and all parts of Europe where feuds prevailed. (Du Cange, *Gloss.*, ad vocem *Pares*.) It was essentially different from the trial by jury, which could never be accurately called *judicium parium*. We read frequently in the records of those times (and even in Magna Charta itself), of *juratores*, of *veredictum* or *juramentum legalium hominum*, and *jurata vicineti* or *patriæ*, all of which expressions refer to a jury; but not a single instance can be found in any charter, or in any antient treatise or judicial record, in which the jury are called *pares*, or their verdict *judicium*. (Reeves's *History of the Law*, vol. i., p. 249.) In the records of the 'Curia Regis' in the first year of John's reign, among numerous entries of *Ponit se super juratam vicineti* or *patriæ*, are also entries of *Ponit se super pares suos de eodem feodo*, plainly indicating a distinction between the two modes of trial. (*Rotuli Curiæ Regis*, vol. ii., p. 90.)

Until about the reign of Henry VI. the trial by jury was to all intents and purposes a trial by witnesses. The present form of the juror's oath is that they shall 'give a true verdict, *according to the evidence*.' At what precise time this form was introduced is uncertain; but for several centuries after the Conquest, the jurors both in civil and criminal cases were sworn merely *to speak the truth*. (Glanville, lib. ii., cap. 17; Bracton, lib. iii., cap. 22; lib. iv., p. 287, 291; Britton, p. 135.) Hence their decision was accurately termed *veredictum*, or verdict; whereas the phrase 'true verdict' in the modern oath is not only a pleonasm, but is etymologically incorrect, and misdescribes the office of a juror at the present day. Many other incidents of the trial by jury, as recorded in antient treatises, conclusively show that the jury were merely witnesses. They were brought from the neighbourhood where the disputed fact was suggested to have occurred, because, as the form of the jury process says, they were the persons 'by whom the truth of the matter might be better known;' no doubt upon the principle that *Vicini vicinorum præsumuntur scire*. Again, if the jurors returned by the sheriff in the first instance declared in open court that they knew nothing of the matter in question, others were summoned who were better acquainted with it. (Glanville, lib. ii., cap. 17.) They might be excepted against by the parties upon the same grounds as witnesses in the Court Christian. They were punished for perjury if they gave a wilful false verdict; and for *crassa ignorantia* if they declared a falsehood or hesitated about their verdict upon a matter of notoriety, which all of the country (*de patriâ*) might and ought to have known. (Bracton, p. 290.) And antient authors solemnly admonish judges to 'take good heed in inquisitions touching life and limb, that they diligently examine the jurors from what source they obtain their knowledge, lest peradventure by their negligence in this respect Barabbas should be released and Jesus be crucified.' (Bracton, lib. iii., cap 21; Fleta, lib. i., cap. 34.) It is also remarkable, as one of the numerous circumstances which show the character of the jury in the earlier periods of the history of the institution, that though all other kinds of murder might be tried by a jury, murder by poison was excepted, 'because,' say the antient writers, 'the crime is so secret that it cannot be the subject of knowledge by the country.' (Bracton, lib. iii., cap. 18; Fleta, lib. i, cap. 31.)

The original principle and character of the trial by jury in criminal cases in Scotland appear to have been the same as in England. The following extract is taken from a curious paper delivered to the Speaker of the House of Commons, and recorded on the Journals at the date 4th June, 1607. (*Comm. Journ.*, vol. i., p. 378.) 'In Scotland criminal causes are not governed by the civil law; but *ordanes** and juries pass upon life and death, very near according to the law here (in England). Which jury being chosen out of the Four Halfs about (as the Scottish law terms it), which is to say, out of all places round about that are nearest to that part where the fact was committed, the law doth presume that the jury may the better discern the truth of the fact by their own knowledge; and therefore they are not bound to examine any witnesses, except out of their own disposition they shall please to examine them in favour of the party persuer; which is likewise very seldom or almost never used. It is of truth that the judge may either privately beforehand examine such witnesses as either the party persuer will offer unto him, or such others as in his own judgment he thinks may best inform him of the truth; and then when the jury is publicly called and admitted, he will cause these depositions to be produced and read; and likewise if the party persuer desire any witness there present to be examined, he will publicly do it in presence of the jury and both parties.' It will be observed, that the

* This word is so printed in the Journals, but it is probably a mistake for some other word.

mode of commencing the introduction of evidence to juries as described in this document bears a strong resemblance to the growth of the proceeding in England.

The earliest traces of the examination of witnesses or of evidence being laid before juries in England, which formed the commencement of a total change in their character, occur in the reign of Henry VI. The change was not effected suddenly, or by any particular act of parliament, but was introduced by slow degrees as population increased, and the habits and manners of society underwent alteration; and though distinctly discernible in the reign of Henry VI., was not completely effected before the times of Edward VI. and Mary. Fortescue, in the 26th chapter of his work 'De Laudibus Legum Angliæ,' written at the end of the reign of Henry VI., and about the year 1470, expressly mentions that witnesses were examined and sworn before the jury; but he calls the jury indiscriminately *testes* and *juratores*, and makes frequent allusions to their character as witnesses. Shortly after Fortescue's time, namely, in the year 1498, there is a reported case between the bishop of Norwich and the earl of Kent (*Year Book*, 14 Henry VII.), in which a jury had been separated by a tempest 'while the parties were showing their evidence:' and one question raised for the opinion of the court was, whether, when the jury came together again, they were competent to proceed with the case and to give a verdict. The objection pressed was that the jury had separated before the evidence was given; to which it was answered that 'the giving the evidence was wholly immaterial, and made the matter neither better nor worse; that evidence was only given in order to inform the consciences of the jury respecting the rights of the parties; but that if neither party choose to give evidence, still the jury would be bound to deliver a verdict.'

About the same period, that is, in the reign of Henry VII., it appears from records printed in Rastell's Entries that demurrers to evidence were an acknowledged form of proceeding, which shows that at that time evidence of some kind was given, and consequently that the character of the jury had been in some degree changed from that of *witnesses* to that of *judges* of facts upon testimony. The proofs mentioned in these records are called *evidentia*; and it is most probable that at first the only evidence given consisted of deeds, writings, and of depositions of absent witnesses taken before the justices of the peace or other magistrates, and that oral testimony was not common until a later period. The entire absence of all mention of evidence or witnesses, as contradistinguished from jurors, in treatises, reports, records, or statutes, previously to the sixteenth century, strongly corroborates the fact of the early character of the trial by jury. There is no trace of any rules of evidence, nor of any positive law compelling the attendance of witnesses, or punishing them for false testimony or non-attendance, nor of the existence of any process against them before the stat. 5 Eliz., c. 9 (1562). In the case of Summers *v.* Mosely, reported in 2 Crompton and Meeson, p. 485, Mr. Baron Bayley says that he had been unable to find any precedents of the common *Subpœna ad testificandum* of an earlier date than the reign of Elizabeth, and expresses a conjecture that this process may have originated with the above-mentioned statute. The *Subpœna ad testificandum* does not appear in the registers of Writs and Process until the reign of James I. (West's *Symboleography*.) Witnesses were examined orally upon the trial of Sir Thomas More, in the reign of Henry VIII.; but the reported state trials in the reigns of Edward VI. and Mary show that the practice in that respect was then by no means settled. In the reign of Elizabeth however there is abundant proof, from Sir Thomas Smith's 'Commonwealth of England,' and other authorities, that oral testimony was used without reserve (except in state prosecutions) both in civil and criminal trials; and consequently it cannot be doubted that about the middle of the sixteenth century the trial by jury had fully assumed the character in which we are now familiar with it, namely, an institution deciding facts for judicial purposes by means of testimony or evidence produced before the jury.

This view of the original character and office of the jury seems to account for the practice of fining or otherwise punishing juries by the court when they gave an unsatisfactory verdict, a practice which was partially continued, though not without remonstrance by legal authorities, after the nature of the institution had been changed. If juries, who re merely witnesses sent for to inform the court of facts which they were presumed certainly to know, returned a wilfully false verdict, they were guilty of a contempt of justice, and might properly be punished; but when their character was changed, and their verdict depended not on their own knowledge of the facts, but upon the impressions produced on their minds by the evidence, such a course of summary punishment became intolerable injustice; and though occasionally practised in the sixteenth century, was declared to be illegal soon after the Restoration by the celebrated judgment in Bushell's case, reported in Vaughan's Reports, p. 135.

The juries now in use in England in the ordinary courts of justice are grand juries, petty or common juries, and special juries. Grand juries are exclusively incident to courts of criminal jurisdiction; their office is to examine into charges of crimes brought to them at assizes or sessions, and if satisfied that they are true, or at least that they deserve more particular examination, to return a bill of indictment against the accused, upon which he is afterwards tried by the petty jury. A grand jury must consist of 12 at the least, but in practice a greater number usually serve, and 12 must always concur in finding every indictment. No further qualification is required for grand jurors (except in the case of grand jurors at the sessions of the peace, provided for by the recent Jury Act) than that they should be freeholders, though to what amount is uncertain; or freemen, lawful liege subjects, and not aliens or outlaws. (Hawkins's *Pleas of the Crown*, chap. 25, sect. 16.)

Until the end of the thirteenth century the only qualification required for petty or common juries, for the trial of issues in criminal or civil courts, was that they should be 'free and awful men;' *freemen*, as holding by free services or free burgesses in towns; and *lawful* men, that is, persons not outlawed, aliens, or minors, but entitled to the full privileges of the law of England. By the statute of Westminster 2, passed in the thirteenth year of Edward I. (1296), it was enacted that no man should be put on juries who had not some freehold of the value of 20*s*. a year within the county, or 40*s*. without it; and this qualification was raised to 40*s*. in counties by the stat. 21 Edward I. The object of these statutes was to protect poor persons from being oppressed and injured by being summoned on juries, and also to obviate the evil of the non-attendance of jurors, which frequently occurred from their inability to leave their agricultural or handicraft occupations. The stat. 2 Henry V. however was expressly intended to secure the intelligence and responsibility of jurors by requiring a property qualification. With this view it enacted that no person should be a juror in capital trials, nor in any real actions, or personal actions where the debt or damages declared for amounted to 40 marks, unless he had lands of the yearly value of 40*s*.; and if he had not this qualification he might be challenged by either party. This continued to be the qualification of common jurors until the passing of the late statute 6 George IV., c. 50, which repealed all former statutes upon this subject, and entirely remodelled the law respecting juries. By this statute 'every man (with certain specified exceptions) between the ages of twenty-one years and sixty years who has within the county in which he resides 10*l*. a year in freehold lands or rents, or 20*l*. a year in leaseholds for unexpired terms of at least twenty-one years, or who, being a householder, is rated to the poor-rate in Middlesex on a value of not less than of 30*l*., and in any other county of not less than 20*l*., or who occupies a house containing not less than fifteen windows, is qualified and liable to serve on juries in the superior courts at Westminster and the courts of the counties palatine for the trial of issues to be tried in the county where he resides, and also to serve on grand juries at the sessions of the peace, and on petty juries, for the trial of issues triable at such sessions in the county in which he resides.' The exceptions are:—peers, judges of the superior courts, clergymen, Roman Catholic priests, dissenting ministers following no secular employment but that of a schoolmaster, serjeants and barristers at law, and doctors and advocates of the civil law actually practising; attorneys, solicitors, and proctors actually practising; officers of courts actually exercising the duties of their respective offices; coroners, gaolers, and keepers of houses of correction; members and licentiates of the college of physicians actually practising; surgeons, being members of one of the royal colleges of surgeons in London, Edinburgh, or Dublin, and actually practising; apothecaries certificated by the Apo-

thecaries' Company and actually practising; officers in her majesty's navy or army on full pay; pilots licensed by the Trinity House; masters of vessels in the buoy and light service; pilots licensed by the lord-warden of the cinque-ports, or under any act of parliament or charter; household servants of the sovereign; officers of customs and excise; sheriffs' officers, high constables, and parish clerks.

Lists of all persons qualified to be jurors are made out by the churchwardens and overseers of each parish, and fixed on the church door for the first three Sundays in September in each year; these are afterwards allowed at a petty sessions and then delivered to the high constable, who returns them to the next quarter-sessions for the county. The clerk of the peace then arranges the lists in a book, which is called the 'Jurors' Book' for the ensuing year, and afterwards delivers it to the sheriff. From this book the names of the jurors are returned in panels to the different courts.

Special juries are composed of such persons as are described in the 'Jurors' Book' as esquires, and persons of higher degree, or as bankers or merchants; and it is the duty of the sheriff to make a distinct list of such persons, which is called the 'Special Jurors' List.' When a special jury is ordered by any of the courts, which must always be the result of a special application of one of the parties, 48 names are taken by ballot from this list in the manner particularly described in the statute, which are afterwards reduced to 24 by means of each party striking out 12; and the first 12 of these 24 who answer to their names in court are the special jury for the trial of the cause.

The legitimate mode of objecting to a jury by the parties is by challenge, though in modern practice this course is seldom resorted to, having yielded to the more convenient usage of privately suggesting the objection to the officer who calls the jury in court; upon which the name objected to is passed over as a matter of course without discussion. This practice, though a far less troublesome and obnoxious mode of effecting the object of obtaining a jury indifferent between the parties than a formal challenge, is strictly speaking irregular, and being considered to take place by consent, and as a matter of favour, cannot be insisted upon as a right. Challenges are of two kinds: challenges to the *array*, and challenges to the *polls*. The challenge to the array is an objection to the whole panel or list of jurors returned for some partiality or default in the sheriff or the under-sheriff by whom it has been *arrayed*. Challenges to the polls are objections to particular jurors, either on the ground of incompetency (as if they be aliens, or of insufficient qualification within the provisions of the Jury Act, 6 Geo. IV., cap. 50), or of bias or partiality, or of infamy as having been convicted of some crime which the law deems infamous. Upon these challenges the cause of objection must in each case be expressly shown to the court; but in trials for capital offences the accused is entitled to challenge *peremptorily* (that is, without giving any reason) thirty-five jurors. The king however, as nominal prosecutor, has no right of peremptory challenge, though he is not compelled to show his cause of challenge until the panel is gone through, and unless a full jury cannot be formed without the person objected to.

The trial by jury, originally introduced into the law of France in criminal cases by the National Assembly, was retained in the French code. An account of the proceeding and of the qualifications and formation of the jury will be found in the *Code d'Instruction Criminelle*, livre ii., tit. 2, chap. iv. and v. See also *Edinburgh Review*, vol. xvii., p. 97, and the article CODES, LES CINQ. It has often been remarked as a singular fact that the institution which in England has been highly prized as a security to the subject against the crown, should have been preserved in France by a despotic monarch, in the zenith of his power, and certainly not disposed to enlarge popular authority. Of late years the advantage of the trial by jury has been frequently the subject of debate among German and French jurists, and in particular the propriety of its introduction has been discussed in the various commissions issued with a view to reforming the laws of several of the German States. [FEUERBACH.] The latest discussion of the latter kind related to the proposal to introduce the jury trial in the Canton de Vaud. The report of a commission issued by the state to inquire into this subject in 1836, against the jury, signed by a majority of the commissioners, and also a protest or counter-report containing the reasons of the only commissioner who dissented from the report, have been published. Upon the subsequent discussion of the proposition in the Grand Council, in December, 1836, the introduction of the trial by jury in the canton was negatived by a majority of 90 to 40 voices.

Anciently in Scotland all offences were tried by juries; at present all prosecutions of a higher nature must proceed by an assize or jury of 15 men, who determine their verdict by a majority of voices. (See Erskine's *Principles of the Law of Scotland*, book iv., tit. 4.) In the course of the improvements of the court of session projected and partly executed in the years 1808 and 1809, an attempt was made to introduce the trial by jury into civil proceedings in Scotland; but great and general opposition was made to it in that country, and the proposition was not at that time carried into effect. But in the year 1815 a statute (55 Geo. III., c. 42) was passed, though then still much opposed in Scotland, which established a jury court, not as a separate and independent tribunal, but as subsidiary to the court of session, for the trial of particular questions of fact to be remitted for trial by the judges of the court of session at their discretion. In order to meet a conscientious difficulty much insisted upon in petitions from Scotland against this measure, namely, that it would be often impossible for a jury to give a unanimous verdict unless some of the members violated their oaths, it was provided by the act that if the jury are not unanimous in 12 hours, they shall be discharged, and a new trial granted. The judges of this court, called the 'Lords Commissioners of the Jury Court in Civil Cases,' are appointed by commission, and consist of a chief judge and two other judges. The stat. 59 Geo. III., c. 35, which recites that the introduction of the trial by jury in civil cases by the former act had been found beneficial, enacts a variety of improvements in the machinery of the jury courts, and makes them a permanent part of the judicial establishment of Scotland. By the stat. 2 Geo. IV., and 1 Will. IV., c. 69, the jury court as a separate tribunal was abolished, and the trial by jury was united with the ordinary administration of justice in the court of session.

JUSSIEU, ANTOINE LAURENT DE, an eminent French botanist, was born at Lyon in 1748, and arrived in Paris in 1765 for the purpose of completing his education as a medical practitioner. He was then placed under the care of his uncle Bernard de Jussieu, at that time one of the demonstrators of botany in the Jardin du Roi, a man possessing a profound knowledge of plants, and who probably gave his nephew the first interest in that science which he subsequently illustrated with so much success. In the year 1770, his medical studies having been completed, he took the degree of doctor of medicine, on which occasion the title of his thesis was, *An œconomiam vitalem inter et vegetalem analogia*, a subject which sufficiently marks the turn his studies had already taken. In the same year he was nominated botanical demonstrator in the Jardin du Roi, as a substitute for Lemonnier, whose duties as chief physician to the king prevented his executing that office in person. Thus at the early age of twenty-two years Jussieu found himself under the necessity of undertaking the duty of teaching students the essential characters of the plants cultivated in the Paris Garden, a task for which experience in details and practical knowledge were required, rather than that general acquaintance with botany which a young man just released from his medical curriculum might be expected to possess. This obliged him to study one day the subjects to be demonstrated the next, and to occupy himself incessantly with acquiring a correct practical acquaintance with plants. At that time the collection of plants in the Jardin du Roi was arranged according to the method of Tournefort; but shortly afterwards it became necessary to rearrange it. Of this opportunity Jussieu took advantage; he drew up a memoir upon a new method of arrangement, which was read before the Academy of Sciences, and afterwards carried into effect in the Garden. The idea of this method was undoubtedly taken from a classification of the plants in the Royal Garden of Trianon, executed under the direction of his uncle; but it was different in much of the details, and was prepared without consultation with Bernard de Jussieu, who in fact was at that time old, nearly blind, ill, and incapable of taking part in any mental exertion. Previously to this, young De Jussieu had studied the natural order Ranunculaceæ with so much attention, that he had made it the subject of a communication to the Academy of Sciences, in whose Transactions it was printed. In after-years he used to say that it was the composition of

this memoir which had opened his eyes to the real principles of botanical classification and made him a botanist. It is here that is found the first distinct trace of those clear ideas concerning the relative importance and subordination of characters which the author subsequently applied to the whole vegetable kingdom. In reality there is no natural order of plants altogether so well suited for this purpose as that which happened to be selected.

From this time, that is, from the year 1774 up to 1789, De Jussieu was constantly occupied in demonstrating to his class of botany, and as his new method was thus brought perpetually before him, with all its advantages and disadvantages in practice, he was able to alter and improve it yearly. The distinctions of genera, their mutual relation, the natural sequence of his orders, and in addition all that was written by other botanists during this period, became so familiar to him, that his son records his having actually commenced his great work, the 'Genera Plantarum,' in 1788, without having prepared more than the commencement of the manuscript; and he adds, that he was seldom, during the printing, above two sheets in advance of the compositors; a very remarkable circumstance, if the extreme attention to clearness and arrangement conspicuous in this work are borne in mind. It is however always to be remembered, that in those days botany was not what it now is; Jussieu enumerated only 2700 genera, while one, not of the latest general works, includes between 7000 and 8000.

This extraordinary work made its way slowly. At the time of its appearance the greater part of botanists were full of zeal and prejudice in favour of the sexual system of Linnæus; an idea prevailed that botany was merely the art of distinguishing one thing from another; and moreover the political state of Europe was most unfavourable to scientific investigations. As tranquillity was restored in France, the work of Jussieu began to be studied, and being studied it soon became the text-book of all the botanists of reputation in that country. But in the other nations of Europe it was otherwise. In England, when Dr. Robert Brown published his 'Prodromus Floræ Novæ Hollandiæ,' in 1810, upon the system of Jussieu, there probably were not more than two other botanists in this country who could understand or make use of it; and it was not till after the year 1820 that it became much known among us.

In his 'Genera Plantarum,' Jussieu divided the vegetable kingdom into classes, subclasses, orders, and genera, not according to certain arbitrary distinctions, but by taking into consideration all the circumstances which he was acquainted with in their manner of growth and degree of development. Those which he regarded as the least perfectly organized species he stationed at the one end of his system, and, proceeding upon the principle of continually grouping together those plants which resemble each other more than they resemble anything else, he gradually arrived at the highest forms of vegetable life through a long series of intermediate gradations. In determining the relative dignity of his orders, he assumed that those species are least perfectly organized which have no cotyledon or rudimentary leaf in their embryo; that next in degree, but higher than these, are such as have one cotyledon; and that highest of all are those whose seeds have two cotyledons: hence his classes *Acotyledons*, *Monocotyledons*, and *Dicotyledons*. In arriving at this conclusion he was justified by the fact that to the highest class belong the lofty trees of the forest, with all their intricate apparatus of trunks, and arms, and branches; to the middle the simple-stemmed palms, lilies, and grasses; and to the lowest such forms of vegetation as fungi, lichens, and sea-weeds.

In determining the subordination of the genera assembled under each of these classes Jussieu was influenced by other considerations. He regarded those dicotyledonous genera which have no corolla as lower than such as possess that organ, and among those which have it the adhesion of the parts of the corolla into a tube was looked upon as an indication of a structure inferior to the total separation of the petals: this gave him for his great dicotyledonous class the subclasses *Apetalæ*, *Monopetalæ*, and *Polypetalæ*. In addition to which he formed another subclass, called *Diclines irregulares*, out of such dicotyledonous plants as have the sexes separated, which he considered an irregularity of organization. As a last method of division Jussieu applied to Monocotyledons and all the subclasses of Dicotyledons a principle of analysis dependent upon the situation of the stamens, calling them *hypogynous* if the stamens originate clear of both calyx and ovary; *perigynous* if they grow from the calyx or corolla; and *epigynous* if their apparent origin is in the apex of the ovary. There seems to have been no other reason for this than that such a 'triplex staminis situs' was found to exist. The result of all these distinctions was the following scheme, under which were arranged all the natural orders known to the author:—

'Index Methodi
Ordines Naturales complectentis.

				Class
Acotyledones				1
Monocotyledones	Stamina hypogyna			2
	„ perigyna			3
	„ epigyna			4
Dicotyledones.	Apetalæ	Stamina epigyna		5
		„ perigyna		6
		„ hypogyna		7
	Monopetalæ	Corolla hypogyna		8
		„ perigyna		9
		„ epigyna	Antheris connatis	10
			Antheris distinctis	11
	Polypetalæ	Stamina epigyna		12
		„ hypogyna		13
		„ perigyna		14
	Diclines irregulares			15

In the state of science when this system was promulgated its excellence was most remarkable, nor is it certain even now in what way it can be best improved. Its faults are the artificial nature of all the divisions except those which are primary, the difficulty in many cases of determining to which of them a given plant belongs, and the numerous exceptions to which they are all subject, which may be owing to their being mere structural and not physiological distinctions. They have accordingly been much criticised, especially of late years, and every original writer attempts to improve them, with various success. But to use the words of his son, to whose sentiments it is impossible for any botanist to refuse his assent, 'What is it that is most admired in this work? not so much the systematical key, which has been so often attacked and abandoned by modern writers, as the admirable sagacity which regulated all the details. It is the neatness of the characters, the happy employment of such as had been previously neglected, and the correct estimate of their value, the prodigality with which notes full of deep knowledge and fruitful in new ideas are dispersed throughout the work, the endless questions and doubts, which show how much the author had meditated upon his subject, and that he was among the first to regret the sacrifices he was compelled to make to the necessity of a systematical arrangement; and finally, that instinct, so true to natural affinities, which so often made him suspect the truth when he could not establish it.'

No doubt Jussieu was largely indebted to our countryman Ray, whose name however does not appear among his introductory remarks; no doubt he was also assisted most essentially by Tournefort, Linnæus, and other systematical writers; but we are not on that account to withhold from him one particle of that merit which his countrymen eagerly claim for him. Ray could not apply his own principles; Tournefort and Linnæus were mere system-makers, who did not understand the principles of philosophical classification; but Jussieu had the philosophy of the one, the systematical abilities of the others, and the peculiar skill of combining them into a consistent whole. His 'Genera Plantarum' is now obsolete, but the recent publication of a new edition of his beautiful 'Introductio in Historiam Plantarum,' with which the work was prefaced, shows that to the last day of his existence Jussieu preserved that brilliant combination of sound philosophical principles with a profound knowledge of facts which has placed him so far above all his countrymen as a botanist.

In 1779, when the 'Genera Plantarum' was published, the political state of France, which put an end to peaceful occupations and turned the public from all thoughts of botany, disturbed the tranquil tenor of the course of Jussieu, and compelled him to mingle in the busy scenes of public life. In 1790 he was named member of the municipality of Paris, and in this character was charged with the direction of the hospitals and charities of that city, which he continued to exercise till 1792. In 1793 the Jardin du Roi was re-or-

ganized under the new name of Jardin des Plantes; all the persons charged with the duty of public instruction were elevated to the rank of professors, and De Jussieu, who had been previously botanical demonstrator, became professor of rural botany. He afterwards became director and treasurer of the Museum of Natural History, and recommenced, in 1802, his botanical writings, chiefly in the form of memoirs upon his own natural orders of plants. These, amounting in number to fifteen, were continued in the 'Annales du Museum' till 1820, after which time De Jussieu became dead to science. He was then seventy-two, with a sight so feeble that it might almost have been called blindness; and he was no longer able to do more than profit by the observations of others. Nevertheless he employed himself between his eighty-third and eighty-eighth year in dictating a new edition of his 'Introductio in Historiam Plantarum.' This work has been published since his death; it is written in elegant Latin, and is a remarkable proof of the vigour of his intellect even at this advanced age. He appears to have been much loved by his family and greatly respected by his friends. His amenity of character was such that he was never in any one of his writings betrayed into a single word of harshness towards his contemporaries. He died, after a short illness, on the 15th of September, 1836, and left behind him a son, Adrien, his successor in his chair of botany, and the inheritor of the virtue and talents of his father.

JUSTICE CLERK OF SCOTLAND. This name properly designated the clerk of court of the chief justice, or lord justiciar, of Scotland; and originally there were as many justice clerks as there were justiciars, that is to say, one for Galloway, one for Lothian, or the territory of the Scots king south of the Forth, and one for Scotland then strictly so called, or the territory north of the Forth.

The same circumstances also which reduced the number of justiciars to one justice-general for the whole realm, reduced likewise the number of justice clerks. The calamitous affair of Flodden however, to which we especially refer, had a further effect on the latter; for by the fall of Lawson and Henryson on that fatal field, the offices of both king's advocate and justice clerk became vacant at one time, and this at a period when perhaps few remained capable of either. Wishart of Pittarrow was appointed to both places, and in his time a deputy was first constituted, to act as clerk to the justice court. This was the first step in the singular rise of the justice clerk from the table to the bench of the Court of Justiciary.

At the institution of the Court of Session in 1532, the justice clerk was made one of the judges. This will not surprise us when we consider the constitution of that court. It was essentially an ecclesiastical tribunal, and, agreeably to the practice of such, deliberated in secret with shut doors. It was necessary therefore for the security of the crown that some of the crown officers should be continually present. The justice clerk was one of these: he was public prosecutor on behalf of the crown. The king's treasurer was another; and accordingly both these were lords of session. For the same reason the king's advocate was made a lord of session; and when, from there being no vacancy, or otherwise, such appointment did not or could not take place, these officers had special writs from the crown authorising them to remain in court during its deliberations.

A further rise of official dignity took place: for it having become usual to appoint certain lords of session as assessors or assistant judges to the lord justice-general, the justice clerk began in the early part of the seventeenth century to be appointed to that duty; and about the middle of the same century he had acquired the style of 'lord justice clerk.' In ten years afterwards the privy council met and passed an act, declaring the justice clerk a constituent part of the justice court; and in the act of parliament 1672, c. 16, he was made the president of the Court of Justiciary, to preside in absence of the justice-general. His rise in the Court of Session followed; for in 1766, when Miller, afterwards Sir Thomas Miller of Glenlee, took his seat on the bench, it was, by desire of the court, on the right of the lord president; to which latter office he himself afterwards rose, being the first justice clerk so promoted. And in 1811, when the Court of Session was, by 48 Geo. III., c. 151, divided into two chambers, the lord justice clerk was made *ex officio* president of the second division, where the individual then appointed still remains. His salary is 2000*l.*, besides an equal sum as a lord of session. In the end of the fourteenth century it was 10*l.* Scots, or 16*s.* 8*d.* sterling.

With respect to the *justice clerk depute*, that officer was long so termed; but at length, when the justice clerk acquired the style of lord, and was declared a constituent part of the Court of Justiciary, his *depute* came to be termed 'the principal clerk of justiciary,' and this becoming a sinecure, he got himself a 'depute' about the middle of last century, and the second depute about thirty years ago an 'assistant;' all of whom continue to this day, and are in the gift of the lord justice clerk. It is not a little remarkable, that on both occasions when these changes took place, there took place also not a diminution, as we might expect, but a duplication of the salary; that of the first depute being raised in 1764 from 100*l.* to 200*l.*, and that of the second depute, in 1795, from 80*l.* to 150*l.* The present principal clerk of justiciary, so called, is the justice clerk's son; and his substitute, or the second depute clerk, is the justice clerk's Court of Session clerk.

Besides these there are three other justice clerk deputes, and his appointees. They are commonly called the 'circuit clerks,' being his deputies to the three circuits of the Court of Justiciary. They had their origin in the act 1587, c. 82, which directed such circuits to be made, in place of the former practice of the justiciar passing through the realm from shire to shire successively.

JUSTICES OF THE PEACE are persons appointed to keep the peace within certain prescribed limits, with authority to act judicially in criminal causes, and in some of a civil nature arising within those limits, and also to do certain other things in which they act not judicially but ministerially, *i.e.* as servants of the crown performing official acts in respect of which they are entrusted with no judicial discretion. The authority of justices of the peace is derived from the king's prerogative of making courts for the administration of the law, or created by different statutes; their duties are expressed in the royal commission appointing them to the office, or are prescribed by those statutes.

Before the reign of Edward III. there were in every county conservators of the peace, whose duty it was to afford protection against illegal force and violence. These conservators were chosen by the freeholders assembled in the county court under the king's writ.

The lord chancellor, the judges of the king's bench, and every sheriff and coroner, were conservators, and are now justices, of the peace, by virtue of their office; and some lands are holden under the service annexed to the tenure of such lands of being conservators of the peace, or of providing fit persons to perform the duties of that office. High and petty constables are also by virtue of their offices conservators of the peace. The authority of conservators of the peace at the common law was the same as that now exercised by constables within their respective townships; and their duty consisted in acting themselves, and commanding the assistance of others, in arresting and quieting those who in their presence and within the limits of their jurisdiction went about to break the peace.

The following account is generally given of the origin of the present justices of the peace. Upon the compulsory resignation of Edward II., Edward III., or rather his mother Isabella, in his name, sent writs to the different sheriffs, stating that his accession had taken place with his father's assent, and commanding that the peace should be kept on pain of disinheritance and loss of life and limb. Within a few weeks from this time it was ordained, by 1 Edward III. c. 16, that for the better keeping and maintaining of the peace in every county good and lawful men who were not maintainers of barretry (malveiz barrets) should be assigned to keep the peace. The mode in which these new keepers of the peace were to be assigned was construed to be by the king's commission; and this ordinance had the double effect of transferring the appointment from the people to the crown, and of laying a foundation for the gradual accession of those powers which are now exercised by justices of the peace.

By 12 Richard II., c. 10, the wages of justices of the peace are fixed at four shillings per day of sessions, and two shillings for their clerks, payable out of the fines and amerciaments at such sessions; but these wages, like those of members of parliament, have long ceased to be received.

Justices of the peace are appointed either by act of parliament, by royal charter (in the case of justices in boroughs not within the Municipal Corporation Act the charter usually appointing certain municipal officers to be justices, and prescribing the manner in which vacancies in the offices are

to be filled up), or by a commission from the crown under the statute of 1 Edward III. The form of the commission of the peace has from time to time been altered, and the authority of the justices enlarged. As now framed it consists of two distinct parts, and contains two separate assignments or grants of authority. Of these the former gives to any one or more justices not only all the power relating to the maintenance of the peace which was possessed by the conservators at common law, but also all the additional authority mentioned in the statutes. The latter assignment defines the power of justices when the whole body, or such of them as choose to attend, act together in general sessions. [SESSIONS.]

The former part of the commission is as follows:—'Victoria, &c., to AB, CD, EF, &c., greeting: Know ye that We have assigned you jointly and severally, and every one of you, Our justices to keep Our peace in Our county of Z, and to keep and cause to be kept all ordinances and statutes for the good of the peace and for the preservation of the same, and for the quiet rule and government of Our people made, in all and singular their articles in Our said county, as well within liberties as without, according to the force, form, and effect of the same, and to chastise and punish all persons that offend against the form of those ordinances or statutes, or any one of them, in the aforesaid county, as it ought to be done according to the form of those ordinances and statutes; and to cause to come before you or any of you all those who to any one or more of Our people, concerning their bodies or firing their houses, have used threats, to find sufficient security for the peace or their good behaviour towards Us and Our people, and if they shall refuse to find such security, then them in Our prisons, until they shall find such security, to cause to be safely kept.'

By 5 Geo. II., c. 18, no attorney, solicitor, or proctor shall be a justice of the peace for any county whilst he continues in practice. By 18 Geo. II., c. 20, no person shall be capable of acting as a justice of the peace for any county, riding, or division, within England or Wales, who shall not have, in law or equity, to and for his own use and benefit, in possession a freehold, copyhold, or customary estate for life, or for some greater estate, or an estate for some long term of years determinable upon life or lives, or for a certain term originally created for twenty-one years or more, in lands, tenements, or hereditaments in England or Wales, of the clear yearly value of 100*l.* over and above all incumbrances affecting, and all rents and charges payable out of or in respect of the same, or who shall not be seised of or entitled to, in law or equity, to and for his own use and benefit, the immediate reversion or remainder of and in lands, tenements, and hereditaments, leased for one, two, or three lives, or for any term of years determinable on lives upon reserved rents, and which are of the yearly value of 300*l.*, and who shall not have taken and subscribed an oath stating the nature of the qualifying estate. The third section of this statute imposes a penalty of 100*l.* upon those who act without having taken and subscribed the oath, and for acting without being qualified. The statute however excepts from these provisions certain official persons, &c. A justice of the peace cannot legally act after he has ceased to be qualified; but it is not necessary that he should continue to retain the same qualification, nor will the absence of a qualification render his acts absolutely void.

Justices appointed by act of parliament or by the king's charter are not removable except for misconduct, but the authority of a justice appointed by the king's commission may be determined at the pleasure of the crown, either directly by writ under the great seal, or impliedly, by making out a new commission, from which his name is omitted. But until notice of the revocation of the authority, or publication of a new commission, the acts of the ex-justice are valid in law, and the warrant of a justice remains in force until it be executed, although he die before its execution. The commission is also determined by the death of the king by whom it was issued; but now, by 6 Anne, c. 7, s. 8, all offices, civil and military, are to continue for six months after the demise of the crown, unless sooner determined.

The 9 Geo. IV., c. 17, repeals the statutes which imposed the taking the sacrament of the Lord's Supper as a qualification for office, and requires the following declaration:—'I, AB, do solemnly and sincerely, in the presence of God, profess, testify, and declare, on the true faith of a Christian, that I will never exercise any power, authority, or influence which I may possess by virtue of the office of justice of the peace, to injure or weaken the Protestant church as it is by law established in England, or to disturb the said church, or the bishops and clergy of the said church, in the possession of any rights or privileges to which such church or the said bishops or clergy are or may be entitled.' The omission to subscribe this declaration does not subject a person acting as a justice of the peace to any penalty; the statute (s. 5) merely renders the appointment void; and whilst the justice continues in the exercise of his office his acts are not either void or voidable so as to affect the rights of those who are not privy to such omission.

Justices of the peace, when they are out of the county, &c. for which they are appointed, have no coercive power; but examinations, recognizances, and informations voluntarily taken before them in any place are good. But by 28 Geo. III., c. 49, justices who act for two or more adjoining counties may act in one of those counties for another of them, and those who act for a county at large may act for such county within any city, town, &c., being a county of itself, and situated within, surrounded by, or adjoining to any such county at large; and by 1 and 2 Geo. IV., c. 63, a similar power is given to county justices to act within any city, town, &c., having exclusive jurisdiction, though not a county of itself.

Justices of the peace have in general no authority over matters arising out of the district for which they are appointed, but they may secure the persons of those who are charged before them with felony or breach of the peace; and by the Municipal Corporation Act, s. 111, in every borough to which the king does not grant a separate court of quarter-sessions the justices of the county within which such borough is situated are to exercise in it the same jurisdiction as in any other part of the county.

By 24 Geo. III., c. 55, if any person against whom a warrant is issued escape, go into, reside, or be in any other county, &c., out of the jurisdiction of the justice granting the warrant, any justice of the county, &c., where such person escapes, &c., upon proof on oath of the handwriting of the justice granting the warrant, is to indorse his name thereon, which will be a sufficient authority to execute the warrant in such other jurisdiction, and carry the offender before the justice who indorsed the warrant, or some other justice of the county, &c., where it was indorsed. Summonses and warrants issued by borough justices, appointed under the provisions of the Municipal Corporation Act, in a matter within their jurisdiction, may be executed at any place within the county in which the borough is situated, or at any place within seven miles of such borough, without being backed.

The judicial authority of a justice out of sessions is both civil and criminal—civil, where he is authorized by statute to adjudicate between master and servant, or to enforce the payment of rates, tithes, &c., or the observance of the regulations of friendly societies [FRIENDLY SOCIETIES], &c.; criminal, where he requires surety of the peace or a recognizance for the peace or for good behaviour, or where he acts in the suppression of riots, or where he acts with summary power to decide upon the guilt or innocence of the party accused, according to the view which he may take of the evidence, and to punish the offender. But all proceedings before justices, whether civil or criminal, if removed into the King's Bench, are there treated as belonging to the crown side of the court.

Where a statute empowers justices to hear and determine an offence in a summary way, it is necessarily implied that the party be first cited to appear, so that he may have an opportunity of being heard, and of answering for himself; and to proceed against an offender without causing him to be summoned is a misdemeanour. A statute authorizing justices to require any person to take the oath of allegiance, or to do some other specific act, impliedly gives them power to issue their precept requiring the attendance of the party.

Upon the hearing of informations and in other preliminary proceedings before justices out of sessions neither the prisoner on the one hand, nor the prosecutor on the other, can claim as of right, and against the will of the justices, to have a legal adviser present, except, it would seem, in cases in which the deposition may by some statutory provisions be made evidence against the accused upon his trial for the offence in the event of the death of the witness. In practice however both counsel and attorneys are frequently admitted as a matter of courtesy to advise and protect the interest of prisoners. Every person has a right to be present before

a justice, acting in his judicial capacity. But although in such a case counsel or attorneys, or any third persons, are at liberty to attend, they cannot insist upon being heard on behalf of their respective clients; the justices may refuse to hear them, or to allow them to interfere with the proceedings. But now, by 6 and 7 Will. IV., c. 114, in all cases of summary conviction, persons accused are to be admitted to make their full answer and defence, and to have all witnesses examined and cross-examined by counsel or attorney. In all cases where justices are directed to take examinations or evidence, it will be implied that the examination or evidence is to be taken under the sanction of an oath or solemn affirmation.

Statutes frequently empower justices to award damages to an injured party, as in cases of assault [ASSAULT], or malicious injuries to property. [MALICIOUS INJURIES.]

Where a complaint is made before a justice, and a summons or warrant issues, the justice upon hearing and determining the matter may award costs to either party, and enforce the payment of such costs.

Justices ought not to exercise their functions in cases in which they are themselves the persons injured. They should cause the offenders to be taken before other justices, or, if present, should desire their aid. In all cases which a justice may hear and determine out of sessions upon his own view, or upon the confession of the party, or upon oath of witnesses, he ought to make a record on parchment under his hand of all the proceedings and proofs, which record should in the case of summary convictions be returned to the next sessions and there filed.

By 27 Geo. II., c. 20, in all cases where a justice is required to issue a warrant for the levying of any penalty inflicted, or any sum of money directed to be paid, by any statute, the justice granting the warrant is empowered therein to order and direct the goods distrained to be sold within a certain time, to be limited in such case (so as such time be not less than four days, or more than eight days), unless such penalty, or sum of money, with reasonable charges of taking, keeping, and selling the distress, be sooner paid.

When justices refuse to hear a complaint over which they have jurisdiction, or to perform any other duty which the law imposes on them, the party aggrieved by such refusal may apply to the court of king's bench for a writ of mandamus, a process by which the king requires the party to whom it is addressed to do the thing required or to show cause why it is not done. If no sufficient excuse be returned, a peremptory mandamus issues, by which the party is commanded absolutely to do the thing required. [MANDAMUS.] But as justices have no indemnity in respect of their acts because done in obedience to a mandamus, this process is not granted where there is anything like a reasonable doubt of the justice's authority to do the required act.

Justices of the peace are strongly protected by the law in the execution of their office. Opprobrious words which would not subject the speaker to any proceeding, civil or criminal, if uttered under other circumstances, yet if spoken of a justice whilst actually engaged in his official duties may be made the subject of an action or of an indictment, or if spoken in the presence of the justice may be punished by commitment to prison as for a contempt of court; this commitment however must be by a written warrant.

Where a justice of the peace acting in or out of sessions acts judicially in a matter over which he has jurisdiction, and does not exceed his jurisdiction, he is not liable to an action however erroneous his decision may be; nor will even express malice or corruption entitle a party aggrieved by such decision to any remedy by action: the delinquent magistrate is answerable only to the crown as for an offence committed against the public. Where the justice has no jurisdiction or exceeds his jurisdiction, or having jurisdiction deviates from the prescribed legal form to an extent which renders the proceedings void, or where a conviction under which the justice has granted a warrant is set aside by a superior court, an action will lie against the justice to recover damages in respect of any distress, imprisonment, or other injury which may have resulted from his acts, though done without malice or other improper motive. But even in these cases, if the justice has acted *bonâ fide* in his magisterial capacity, if he has intended to act within his jurisdiction, though by mistake he may have exceeded it and not acted within the strict line of his duty, and also in cases where a justice has acted or intended to act in the execution of his ministerial duties, he is entitled to the protection of several important statutory regulations, though where there is no colour whatever for a belief or supposition on the part of the justice that he is acting within his jurisdiction, where the act is wholly alien to the magisterial functions and done *diverso intuitu*, these regulations do not apply.

Thus, no action can be brought against a justice of the peace for anything done by him in the execution of his office without one calendar month's previous notice in writing, specifying the cause of the intended action, within which period of one month the justice may tender amends to the party complaining, which will be a bar to the action, if refused, and found to be sufficient by the jury. Nor can any such action be maintained unless it be commenced within six calendar months after the committing of the act complained of; nor unless it be brought or laid in the county in which the act was committed. The defendant in such action may under the general issue, *i.e.* a plea simply denying the alleged trespass, &c., give in evidence any matter of justification or excuse without being bound, as other defendants are, to select one particular line of defence, and set that defence with precision upon the record in the shape of a special plea. When the plaintiff in such action obtains a verdict and the judge certifies that the injury for which the action is brought was wilful and malicious, the plaintiff will be entitled to double costs of suit.

Where the action is brought on account of any conviction which may have been quashed, and cannot therefore be produced as a justification of the consequent distress or imprisonment, the plantiff is disabled, by 43 Geo. III., c. 141, from recovering more than 2*d.* damages, or any costs of suit unless it be expressly alleged in the declaration that the acts complained of were done maliciously and without any reasonable or probable cause.

When a justice acts with partial, corrupt, or malicious motives he is guilty of a misdemeanor, for which he may be indicted, and in a clear case of misconduct the court of King's Bench, which exercises a general superintendence over the conduct of those to whom the administration of the criminal law of the country is entrusted, will, if the application be made without delay, give leave to file a criminal information. But the court will consider, not whether the act complained of be strictly right or not, but whether it proceeded from unjust, oppressive, or corrupt motives, among which motives fear and favour are both included. If the affidavits filed in support of the application disclose nothing which may not be attributable to mere error or mistake, the court will not even call upon the justice to show cause why a criminal information should not be filed. The court will not entertain a motion for a criminal information against a justice of the peace, unless notice of the intended application have been given in sufficient time to enable him, if he thinks proper, to meet the charge in the first instance by opposing the granting of the rule to show cause.

The proceedings after an information has been filed or an indictment found against justices of the peace for criminal misconduct are the same as in other cases of misdemeanor. If the defendant suffer judgment by default, or is found guilty by the verdict of a jury, the punishment is by fine or imprisonment or both; after which an application may be made to the lord chancellor to exclude him from the commission; and when affidavits are filed in the King's Bench impeaching the conduct of justices of the peace, such affidavits are frequently directed by the court to be laid before the chancellor, to enable him to judge whether such persons ought to remain in the commission.

The institution of justices of the peace has been adopted in most of the British colonies, and has with some modifications been retained in the United States of America.

JUSTI'CIA, a genus of Acanthaceous Exogens, whose numerous species inhabit all the tropical parts of the world, preferring however damp woods to dry and open plains. It is especially in the forests of Brazil and India that they occur. Many of them are never woody, some are bushes or small trees, and a small number are valued by gardeners as objects of ornament. As limited by Linnæus, the genus comprehended a very discordant collection of species; modern writers have accordingly broken it up into many new genera. As now limited, Justicia itself scarcely contains a plant of any importance.

As among the species now removed from Justicia to other genera there are some which are useful as medicinal agents,

especially in India, it may be as well to mention them here, instead of referring to genera which are not yet generally known. Thus Justicia Adhatoda, celebrated in Sanscrit works by various names, as Vidiumatri, Vasika, &c., has been called *Adhatoda Vasika*, and is chiefly esteemed as a demulcent in coughs. *J. Nasuta* is now *Rhinacanthus communis*, and is much employed in Indian medicine, especially for the cure of ringworm and other cutaneous affections, mixed, according to Dr. Roxburgh, with lime-juice and pepper. It is also one of their remedies for snake-bites, but is no doubt inefficacious for such purpose. *Andrographis* (formerly *Justicia*) *paniculata* is the best known and probably the most valuable of all, as one of its names, *Maha tita*, implies *chief*, or *king of bitters*; it is also very commonly called *kalup-nath*, and well known to Europeans in the peninsula of India by the name of *Creyat*, or *Kreat*, and has been prescribed with benefit as a bitter in this country. It forms one of the ingredients of the *Drogue amère*, which is well known in India, and at one time obtained considerable repute as a cure for cholera; but it can be useful only as a stimulant and tonic.

JUSTICIAR OF SCOTLAND. The earliest individual in this high office which extant records name seems to be Geoffrey de Maleville of Maleville in the county of Edinburgh, *temp.* K. Malc. IV.

The term 'Scotland' was then less extensive in its application than at present: it designated, properly speaking, not the whole territory of the realm, but that part only which lay north of the Forth, or *Scots sea*, as it was called; and accordingly, contemporary with Maleville there was another justiciar, David Olifard, justiciar of Lothian, that is to say, the territory south of the Forth, excepting the district of Galloway, which had long its own peculiar laws and customs. About the middle of the thirteenth century however Galloway too had its justiciar, so at this time there were *three* justiciars in the realm of Scotland—a justiciar of Galloway, a justiciar of Lothian, and a justiciar of Scotland strictly so called. They were all probably of co-ordinate authority: each, next to the sovereign, supreme in his district; but the district of the last was the most extensive, and, containing within it the metropolis of the kingdom, it was also no doubt the most important and the most coveted. The justiciars of Scotland were accordingly the most conspicuous men of the time:—the Comyns, earls of Buchan; the MacDuffs, earls of Fife; Melville; and Sir Alan Durward. This last had an eye to the crown itself; for having married the illegitimate daughter of King Alexander II., he gained over the chancellor to move in council her legitimation, and that, on failure of issue of the king's body, she and her heirs might inherit her father's throne. But the king conceived so great a displeasure at this, that he immediately turned the chancellor out of office, and soon afterwards the justiciar also. The proud Durward removed to England, joined King Henry III. in France, and served in his army, till in a few years he was, by the influence of the English king, restored to his office of justiciar, whence he was displaced only by the more powerful Comyn. The incident in Durward's life to which we have just alluded was not singular: the justiciar was *caput legis et militiæ*, at the head both of the law and also of the military force of the kingdom, and repeated instances occur in early times of their military prowess as well as judicial firmness.

The death of King Alexander III. left the crown open to a competition which allowed Edward I. of England to invade the kingdom. In 1292 the English Court of King's Bench sat for some time in Roxburgh; and in 1296 Sir William Ormesby, a justice of the Common Pleas and justice in eyre in England was constituted, by Edward, lord justiciar of Scotland. This appointment was of short duration; but in 1305 Edward, having again put down the Scots, distributed the kingdom into four districts, and constituted for each district two justices (an Englishman and a Scotchman), in the nature of the English justices of assize—with a view to put the whole island under one and the same judicial system. Edward's early death however rendered the scheme abortive; and Galloway had soon its own laws, and Lothian and Scotland their justiciars as before, with this difference, that the metropolis of the kingdom was now shifting southwards to Edinburgh, and the term Scotland, in its strict acceptation, had given place to the appellation 'north of the Forth.' Sir Hugh de Eglinton, justiciar of Lothian in the middle of the fourteenth century, and distinguished for his poetical genius, was now therefore 'Hugh of the Awl Ryal,' or of the royal palace; and towards the end of the next century Andrew lord Gray was advanced from the situation of justiciar north of Forth to that of justiciar south of Forth. He continued in this place with approbation for eleven years, and died but a few months before the calamitous affair of Flodden.

On this event, which happened in the beginning of the sixteenth century, the office of lord justiciar, or, as he was now styled, justice-general (in contradistinction to the special justiciars, now frequently appointed as well for particular trials as for particular places and districts), came into the noble family of Argyle, where it was hereditary for a century, and comprehended at once the entire kingdom. The High Court of Justiciary then also began to be settled at Edinburgh, and the regular series of its records, or books of adjournal, to commence. It was at this time also that the Court of Session was erected by ecclesiastical influence. Various attempts had been made by the clergy in former reigns to establish such a court. In 1425 the first 'Court of the Session' was instituted under the influence of Wardlaw, bishop of St. Andrew's and founder of the university there; but immediately on his death, which happened soon after, it drooped and expired. In 1458 Bishop Shoreswood, the king's secretary, tried to revive it; and about thirty years after, Elphinstone, bishop of Aberdeen, did so likewise. In 1494 however the latter founded, or rather re-founded, the university of Aberdeen, and had interest enough to get an act passed in parliament to enforce in all the courts of the kingdom the study and practice of the Roman laws; and in 1503 the 'Court of Daily Council' was established. This court had a more extensive jurisdiction than the former: it was universal, being instituted to decide all manner of summonses in civil matters, complaints, and causes daily as they happened to occur; and it was calculated to be permanent. But the present was not an opportunity to be lost; and accordingly, in the minority of King James V. and while the nation was weakened and distracted by the loss at Flodden, the Court of Session was established under the lord chancellor, and with a majority of ecclesiastics both on its bench and at its bar. The consequence was, that from that day forward the Court of Justiciary declined; its civil jurisdiction ceased, being engrossed by the Court of Session: and the latter became in its place the supreme court of the kingdom. The Reformation effected a change in the composition of the Court of Session, but not much in its position or powers; and in 1672 an act was passed in parliament constituting a certain number of the judges, or lords of session, judges of justiciary under the justice-general and justice-clerk, who was now made vice-president of the Court of Justiciary.

Nothing else of consequence touching the constitution of the court occurred till lately, when, by 1 Will. IV., c. 69, sec. 18, the office of lord justice-general, which had become in a manner a perfect sinecure, was appointed to devolve on and remain with the office of lord-president of the Court of Session, who should perform the duties thereof as presiding judge in the Court of Justiciary. The effect of which enactment is to place the lord-justice-general again at the head of the administration of the law; and thus, by a singular revolution, restore him, after the elapse of 300 years, to his former situation of lord chief justice of Scotland.

JUSTICIARY, CHIEF, of England (*Capitalis Justitiarius Angliæ*). None either of the English lawyers or legal antiquaries who have handled this subject appear to have given at all a satisfactory explanation of it. As the following passage in the 'Pictorial History of England' affords the best explanation of the difficulty that we have met with, we consider it but fair to give it as it stands in that work. It will be observed that in order to comprehend the functions of the chief justiciary it is necessary first to understand those of 'The *Grand Seneschall*, or *Dapifer*—*Senescallus*, or *Dapifer* Angliæ*; in modern phraseology, the lord high steward—*comes palatii*, *major domus regiæ*, or *maire du palais*. The word *seneschalch*, about the etymology of which opinions vary somewhat, meant originally a

* 'That these terms are synonymous, is shown by Ducange, Spelman, &c. Dapifer seems to have been introduced when a Latin word came to be wanted for seneschall, and was adopted for want of a better, there being no Latin term exactly corresponding. Dapifer has been ignorantly translated "sewer" by Dugdale and others; whereas sewer, so far from meaning seneschall, means only *ecuyer tranchant*, an officer a great many degrees below the seneschall. See Ducange, *ad voc. Dapifer, Senescallus*; Spelman, *ad voc. Dapifer, Capitalis Justitiarius, Senescallus*, and Dugdale's 'Baronage.'

sort of steward in the household of the Frank kings. After their conquest of Gaul, it came to signify a high political dignity.* Dapifer, as shown in the note below, means the same thing, being the Latin synonyme for it. This officer was the highest in the state after the king, executing all the chief offices of the kingdom as the king's representative. He was not only at the head of the king's palace, but of all the departments of the state, civil and military, chief administrator of justice, and leader of the armies in war. This is proved not only to have been the case in France, by Ducange and other high authorities, as well as by the public records of that kingdom,* but to have been so also in England, by a document published by Madox himself, from the black and red books of the Exchequer—to wit, the celebrated *Dialogus de Scaccario*, written in the time of Henry II.;† and likewise by certain MSS. preserved in Sir Robert Cotton's collection in the British Museum, particularly an old MS. entitled "Quis sit Seneschallus Angliæ, et quid ejus officium."‡ Consequently, Madox is wrong when he says ("Hist. Excheq.," p. 28) that in the reign of William I., William Fitz-Osbern was the king's constable, *because* he is called *magister militum*. Whereas in the very same passage (of "Ordericus Vitalis") he is called *Normanniæ Dapifer*, in virtue of which office he would be *magister militum*. It was not till afterwards that the constable became magister militum, being originally an officer subordinate to the dapifer.' (*Pictorial History of England*, vol. i. p. 567.)

By the nature of the feudal system everything had a tendency to be given in fief. 'Among other things, the office of seneschal was given in fief too, and became hereditary among the Franks, Normans, and, at the conquest of England, among the Anglo-Normans. In France, under the Merovingian dynasty, the office was in the family of Charles Martel, from whom sprung the Carlovingian dynasty; afterwards the Plantagenet counts of Anjou were hereditary seneschals of France; and in England this high office was granted by William the Conqueror to the Grantmesnils, and thence came by marriage to the earls of Leicester. After the attainder of the family of Montfort, earls of Leicester, the office was given to Edmund, the second son of King Henry III., and it then remained in the royal family till its abolition—Thomas Plantagenet, second son of King Henry IV., being the last permanent high steward,§ the office being conferred afterwards only *pro unicâ vice*.

'In France, when the office became hereditary in the counts of Anjou, it soon became necessary, for various reasons, to have another seneschal, or dapifer, besides the hereditary one; and this officer, whether he be considered as the representative or deputy of the hereditary seneschal, still took precedence, as appears from the charters of the French kings, of all the other great officers of state. In England also something of the same kind took place, but with this difference—that the various functions of the original grand seneschal, or *senescallus Angliæ*, were divided into two parts, and committed to two distinct officers as his representatives; the judicial functions being committed to an officer styled the High, or rather Chief Justiciary; the administrative and those relating to the affairs of the king's palace or household, to an officer styled, *not* the Senescallus *Angliæ*, but the Senescallus, or Dapifer *Regis*.‖ This explanation will be found to completely remove the confusion that has so long prevailed among the English historians, antiquaries, and lawyers on this subject. Our view of the subject, if it needed it, would be corroborated by the high privileges of the officer created in later times, to preside in the House of Lords at state trials, which officer, be it observed, is not "high justiciary," but "lord high steward," that is "*Senescallus Angliæ*." This explanation also removes the difficulty of accounting for the extraordinary powers of the lord high steward's court, which some English lawyers have attempted to get over, by saying that the lord high steward succeeded to some of the powers of the high justiciary, whereas he merely exercises powers which he had delegated to the high justiciary.'*—(*Ibid.*)

The chief justiciary was usually, even in those times, when, from the circumstance of the king and the great officers of his household acting as judges, we may conclude that a special education was not considered absolutely necessary to fit a man for the judicial office, a person who had given particular attention to the study of jurisprudence. As the representative of the judicial portion of the grand seneschal's power, his authority extended over every court in the kingdom. For as to what Blackstone says† of the court of the marshalsea, *i.e.* the court of the lord steward of the king's household, having never been subject to the jurisdiction of the chief justiciary and no writ of error lying from it to the king's bench, it merely amounts to this, that the court of the lord steward was in fact originally the court of the lord high steward, and in that court either of his representatives, the chief justiciary or the lord steward, might preside.

The chief justiciary not only presided in the king's court and in the exchequer, but he was originally (or rather when the lord high steward fell into abeyance, partly from dread of his power and partly from the impossibility of securing an hereditary succession of the qualities necessary to fulfil his great and numerous duties), by virtue of his office, regent of the kingdom during the king's absence, and at those times writs ran in his name, and were tested by him.‡ And in this light the chief justiciary is regarded as having been the greatest subject in England. One of the most distinguished men who held this high office was Ranulph de Glanville, who is usually regarded as the author of the *Tractatus de Legibus et Consuetudinibus Angliæ*, the oldest book extant on English law.§

The last who held the office and bore the title of *Capitalis Justitiarius Angliæ* was Philip Basset: and the first who held the office of *Capitalis Justitiarius ad placita coram Rege tenenda*, *i.e.* chief justice of the king's bench, was Robert de Bruis, appointed in the fifty-second year of Henry III.‖ Sir Edward Coke was fond of indulging his vanity by bestowing the same title, 'Chief *Justice* of England,' upon himself and on the Grand Justiciary, the mighty *Capitalis Justitiarius Angliæ*; which was noticed by Lord Chancellor Ellesmere in his address to Sir Henry Montague, Coke's successor, upon his being sworn in chief justice, in these words:—'instead of containing himself within the words of the writ to be the chief justice, as the king called him, "ad placita coram nobis tenenda."'

JUSTIFICATION is used in theology to signify the acceptance of a sinner by God, and is frequently employed by the sacred writers as equivalent to the forgiveness of sin. Thus, St. Paul says, 'Be it known unto you therefore, men and brethren, that through this man is preached unto you the forgiveness of sins, and by him all that believe are justified from all things from which ye could not be justified by the law of Moses.' (*Acts*, xiii. 38, 39.) The Protestants and Roman Catholics differ respecting the signification that should be attached to the word justification. The former maintain that the Hebrew word הִצְדִּיק, and the Greek words δικαιοῦν and δικαίωσις, are almost invariably employed in the Bible in a judicial sense; that is, to declare a person righteous notwithstanding the sins he has committed, and to deliver him from the punishment which his sins had deserved. The latter interpret the words in a physical sense; and maintain that to be justified is not to be reckoned righteous by God, but actually to be made righteous by the infusion of a sanctifying principle. The Protestants,

* 'Ducange, Gloss., ad voc. Dapifer et Senescallus. See also the "Grand Coustumier de Normandie," c. x. "Solebat autem antiquitus quidam justiciarius prodictis *superior* per Normaniam discurrere qui seneschallus principis vocabatur."—Conf. "La Coutume Reformée de Normandie commentée par Basnage," t. i, p. 2, col. 2 (Senéschal). See also the charters of the various Frank kings, in the witnessing of which the name of the seneschal or dapifer (sometimes the one word is used, sometimes the other) always stands before those of all the other great officers. It is right to add, that in the English charters, the name of the dapifer, or seneschal, does not *invariably* stand so high as in the French.'

† 'Madox, "Hist. Exchequer" (edition 1711). See also "Co. Litt.," fol. 61 a, for some account of the judicial part of the office of seneschal, or steward, and some attempt at the etymology of the word, not much more successful than attempts of that kind usually are.'

‡ 'Cotton MSS. Vespasian, b. vii., fol 99, b. It will also be found in Harl. MSS. 305, fol. 48, transcribed in a modern hand by D Ewes, who supposed it to be of the age of Edward II. See also Cotton MSS., Titus C. *passim*, at the beginning of which volume there is a well-written tract, which contains the most satisfactory account we have met with of the subject. There is also a tract entitled "Summus Angliæ Seneschallus," in Somers's Tracts, vol. viii. All these agree in one thing, viz.—the vastness and paramount nature of the authority *originally* wielded by the high steward, though none of them explain the anomaly of the co-existence of such an officer as the high justiciary. This we hope we shall now be enabled to do.'

§ 'For a list of high stewards see Harl. MSS 2194.'

‖ 'Among many other proofs of this, see Madox's "Form. Anglic.," cclxxxix.'

* 'See a Disquisition on the Office of Lord High Steward, by Mr. Amos, in Phillips's "State Trials," Appendix, vol. ii. Mr. Amos falls into the usual error of supposing that the judicial authority of the lord high steward grew out of that which appertained to the chief justiciar at the period when the latter office was abolished.'

† III Com. 76.

‡ Madox's 'Hist. of the Exchequer,' p 16.

§ Madox, p. 35; Beames's 'Glanville' [illegible]

‖ Dugd. 'Orig.,' 38.

on the contrary, believe, that though sanctification is a consequence of justification, yet it is a distinct and separate operation.

The reason or cause of our justification is generally divided by theologians into the originating, the meritorious, and the instrumental cause, or the *causa efficiens*, the *causa meritoria*, and the *causa apprehendens*.

1. The *Originating cause* is the love of God towards his fallen creatures (*Rom.* iii. 24; *Eph.* ii. 8). 2. The *Meritorious cause* is, according to the 11th article of the Church of England, and the opinion of most Protestants, 'the merit of our Lord and Saviour Jesus Christ, and not our own works or deservings' (*Rom.* iii. 24; v. 18; *Eph.* i. 7; *Col.* i. 14); but the Roman Catholic church maintains that good works, penances, and the intercession of saints also contribute to our justification. 3. The *Instrumental cause* is faith in the vicarious sacrifice of Christ; since the merit of Christ's sacrifice does not produce our pardon, unless we believe in its efficacy.

The consequences of justification are said to be: 1. peace with God (*Rom.* v. 1); 2. tranquillity of conscience; 3. adoption of the persons justified into the family of God (*Rom.* viii. 14-17); 4. spiritual joy, arising from the belief of our being adopted by God (*Rom.* xiv. 17); 5. the hope of eternal life.

JUSTINIAN'S LEGISLATION. Justinian, soon after ascending the throne, gave orders (Feb. A.D. 528) to a commission consisting of Joannes and nine other persons, among whom were Tribonian or Tribunian, and Theophilus, to make a general compilation of the best and most useful laws, or 'constitutions,' which had been promulgated by the emperors his predecessors, beginning from Hadrian's perpetual edict down to his own time. [CONSTITUTIONS, ROMAN.] Partial compilations had been made in the time of Constantine by private individuals, Gregory and Hermogenes, of which only fragments remain, and a more complete one was effected under Theodosius II. [THEODOSIAN CODE.] All these were now merged in the new code of Justinian. A remarkable difference of style and manner is observable between the older constitutions issued before Constantine and those promulgated afterwards. The former being issued at Rome and framed upon the decisions, or 'responsa,' of learned jurists, are clear, sententious, and elegant; the latter, which were promulgated chiefly at Constantinople in the decay of the Roman language, are verbose and rhetorical. Joannes and his nine associates completed their task in fourteen months, and the new code, having received the imperial sanction, was published in April, A.D. 529. A few years after, Justinian, by the advice of Tribonian, ordered a revision of his code to be made by Tribonian and four others. These commissioners suppressed several laws, as either useless or inconsistent with present usage, and added many constitutions which the emperor had been promulgating in the mean time, as well as fifty decisions on intricate points of jurisprudence. The code thus revised was published in December of the year 534, under the title of 'Codex Justinianeus repetitæ prælectionis,' and thenceforth had the force of law.

The Code is divided into twelve books; every book is subdivided into titles, and each title into laws. Book i. treats of the Catholic faith, defines its creed agreeably to the first four general councils, forbidding public disputations on dogmas; it then treats of the rights, privileges, and discipline of bishops and other ecclesiastical persons; next of heretics, Samaritans, Jews, apostates, &c., against whom it contains several penal enactments; after which the book proceeds to speak of the laws, and their different kinds, and lastly of the magistrates. Book ii. treats of the forms to be observed in commencing a suit; then of restitution, compromises, sureties, and lastly of the oath of calumny.* Book iii. treats of judicia and judices, and judicial proceedings generally; of holidays, of the various jurisdictions, of illegal (inofficiosa) testaments and donations, of dowries and inheritances, of the Lex Aquilia, of mixed actions, of actions for crimes committed by slaves, of gaming, of burying-places and funeral expenses. Book iv. begins with the explanation of personal actions which are founded on loan and other causes; of obligations and actions, with their effect in relation to heirs and other persons bound by them; of testimony and written evidence; of things borrowed for use; of contract by pledge, and the personal action thereon; of compensation, interest, deposit, mandate, partnership, buying and selling, permutation, hiring, and emphyteutic contracts. Book v. treats of betrothment, gifts in contemplation of marriage, of marriages, women's portions, and the action that lies for the recovery of the dowry, of gifts between husband and wife, of estates given in dowry, of alimony, of concubines, natural children, and the process of legitimation. It next treats of tutorships (tutela), of the administration by tutors, and of the alienation of minors' estates. Book vi. treats of slaves, and freedmen, and the rights of their patrons; then it explains at large the Prætorian possession called 'Bonorum possessio:' after which it expounds the whole matter of testaments, as institutions and substitutions of heirs, preteritions and disinheritings, refusals of inheritance, the opening of wills, codicils, legacies, and fiduciary bequests, and lastly succession to the property of intestates. Book vii. treats of manumissions; afterwards of matters relating to prescription, of judgments (sententiæ) and appeals, of the cession of estate or goods, of the seizure of goods, of the privileges of the exchequer, those of dowries, and the revocation of alienations made to defraud creditors. Book viii. begins with interdicts: it then treats of pledges and pawns, of stipulations, novations, delegations, &c. It treats next of the paternal power, of the emancipation of children, and their ingratitude; it then explains what is meant by custom, or unwritten law; it next speaks of gifts (donationes mortis causâ, &c.) and their various kinds; and lastly, of taking away the penalty of celibacy. Book ix. treats of crimes, criminal judgments and punishments. Book x. treats of the rights and prerogative of the exchequer, of vacant goods, of treasurers, taxes levied upon the people, and tolls; of the decuriones and their office, of the freedom of citizens, of domicilia, of public offices and exemption from them, and of the various kinds of public offices and functions appertaining to them. Book xi. treats of the rights common to the city of Rome and municipal towns, the right of having corporate bodies and communities, and the right of having public registers. Book xii. continues the same subject, explaining the right of cities as to having offices civil and military, and also as to having functionaries for the execution of judgments and the orders of magistrates.

The learned Gothofredus, in his Prolegomena attached to his edition of the Theodosian code, observes that Tribonian and his associates have been guilty of several faults in the compilation of the Code; that the order observed in the succession of the titles is confused, that some of the laws have been mutilated and have been rendered obscure, that sometimes a law has been divided into two, and at other times two have been reduced to one; that laws have been attributed to emperors who were not the authors of them, or had given quite contrary decisions; all which would be still more injurious to the study of the Roman law, if we had not the Theodosian code, which is of great use towards rightly understanding many laws in the code of Justinian.

In the year following the publication of the first edition of his Code, Justinian undertook a much greater and more important work; to extract the spirit of jurisprudence from the decisions and conjectures, the questions and disputations, of the Roman civilians. In the course of centuries, under the republic and the empire, many thousand volumes had accumulated, filled with the learned lucubrations of the jurisconsults, but which no fortune could purchase, and no capacity could digest. The jurisconsults ever since the time of Augustus had been divided into opposite schools, and thus conflicting opinions were often produced, which only served to puzzle those who had to decide what was law. To put order into this chaos, was the object of Justinian. In December, 530, he commissioned seventeen lawyers, with Tribonian at their head, with full authority to exercise their discretion as to the works of their predecessors, by making a choice of those whom they considered as the best authorities. They chose about forty out of Tribonian's library, most of them jurisconsults who had lived during that period of the empire which has been sometimes called the age of the Antonines, from Hadrian to the death of Alexander Severus. From the works of these writers, said to have amounted to two thousand treatises, the commission appointed by Justinian was to extract and compress all that was suited to form a methodical, complete, and never failing book of reference for the student of law and the magistrate. Justinian gave Tribonian and his associates ten years' time to perform their task; but they completed it in three years. The work

* Many of the terms here used are terms of Roman law, and as such do not admit of translation by equivalent English terms.

was styled 'Digesta,' and also 'Pandectæ' ('embracing all'), and was published in December, 533. It was declared by the emperor that it should have the force of law all over the empire, and should supersede all the text books of the old jurists, which in future were to be of no authority.

The following is a list of the Roman jurists from whose works the 'Pandect' or 'Digest' was composed, with their several epochs, so far as they can be ascertained, and the relative proportions which they have contributed to the 'Pandect.' Where (*a*) is added, the contribution is less than 1. The sum total of all the figures denotes the whole amount, of which the several figures opposite each jurist's name denote the proportion which his part bears to the whole. In addition to the extracts contained in the 'Pandect' from each author, many of them are very often merely cited.

Aburnus (Valens).
Ælius (Gallus, Marcianus).
Æmilius (Macer, Papinianus).
Africanus, lived in Hadrian's time and was a disciple of Salvius Julianus 24
Alfenus, a native of Cremona, and a pupil of Servius Sulpicius, who died B.C. 43. 9
Anthianus, time unknown . . . . . (*a*)
Anthus (Anthianus).
Antistius (Labeo).
Aquila, supposed by some to have lived under Sept. Severus . . . . (*a*)
Arcadius, under Constantine the Great . . . $2\frac{1}{2}$
Arrius (Menander).
Aurelius (Arcadius).
Cæcilius (Africanus).
Caius (Gaius).
Callistratus, under Caracalla . . . . $17\frac{1}{2}$
Celsus, lived under Trajan and Hadrian . 23
Cervidius (Scævola).
Charisius (Arcadius).
Claudius (Hermogenianus, Saturninus, Tryphoninus).
Clemens (Terentius).
Domitius (Ulpianus).
Florens (Tertullianus).
Florentinus, time uncertain, supposed to have lived under Alex. Severus 4
Furius (Anthianus).
Gaius, lived under Antoninus and Aurelius . 72
Gallus, Aquilius, a friend of Cicero, with whom he was prætor, B.C. 66 . . . . . . (*a*)
Herennius (Modestinus).
Hermogenianus, under Constantine . . . $9\frac{1}{2}$
Javolenus, lived under Trajan . . . . $23\frac{1}{2}$
Julianus, lived under Hadrian, was a pupil of Javolenus, and author of the perpetual edict . 90
Julius (Aquila, Paulus).
Junius (Marcianus).
Justus (Papirius).
Juventius (Celsus).
Labeo, lived under Augustus, was the head of the school called Proculeians from his disciple Proculus 12
Licinius (Rufinus).
Lucius (Mæcianus, Papinianus).
Macer, under Alexander Severus, ... 10
Mæcianus, lived under Antoninus Pius . . 8
Marcellus, under Antoninus and Aurelius . $32\frac{1}{2}$
Marcianus, probably under Caracalla . . 38
Marcus (Labeo).
Massurius (Sabinus).
Mauricianus, lived under Antoninus . . $1\frac{1}{2}$
Maximus, time unknown . . . . . (*a*)
Menander, under Severus and Caracalla . 3
Modestinus, flourished under Alex. Severus and the Maximini . . . . $41\frac{1}{2}$
Mucius, Quintus, son of P. Mucius Scævola, consul in the year 659 of Rome, or B.C. 95 . . 1
Neratius, lived under Trajan 10
Papinianus, under Sept. Severus, whose friend he was; was put to death by Caracalla . . . 104
Papirius, under Marcus Aurelius . . . $2\frac{1}{2}$
Paternus (Tarruntenus).
Paulus, flourished under Alexander Severus . 297
Pomponius, lived under Antoninus Pius; another Pomponius is said to have lived under Alex. Severus 80
Priscus (Javolenus, Neratius).
Proculus, lived under Nero and Vespasian . 6
Publius (Alfenus, Anthianus, Juventius).
Quintus (Mucius, Tertullianus, Venuleius).
Rufinus, about the time of Alex. Severus . $1\frac{1}{2}$
Rutilius (Maximus).
Sabinus, Massurius, flourished under Tiberius, was the head of the Sabinian school . . $1\frac{1}{2}$
Salvius (Julianus).
Saturninus, supposed by some to be the same as Venuleius 1
Saturninus Quintus (Venuleius).
Scævola, Cervidius, under Antoninus and Aurelius . . . . $78\frac{1}{2}$
Scævola, Mucius (Mucius).
Sempronius (Proculus).
Septimius (Tertullianus).
Sextus (Pomponius).
Tarruntenus, under Marcus and Commodus . (*a*)
Terentius, lived under Hadrian and Antoninus $3\frac{1}{2}$
Tertullianus, time uncertain, by some supposed to be the same as the father of the church . . $1\frac{1}{2}$
Titus (Gaius).
Tryphoninus, under Severus and Caracalla . 22
Valens, lived under Hadrian and Antoninus Pius 3
Varus (Alfenus).
Venuleius, under Antoninus and Aurelius . 10
Ulpianus, flourished under Alex. Severus, whose counsellor he was 610
Ulpius (Marcellus).
Volusius (Mæcianus).

If the whole 'Digest' is divided into three equal parts, the contributions of Ulpian are somewhat more than one-third.

The 'Digesta' is divided into 50 books, each book being also divided into titles, and subdivided into sections. The following are some of the principal heads. Book i. lays down the general principles and the different kinds of law; it then establishes the division of persons and of things; then speaks of senators, and of magistrates and their delegates and assessors: ii. treats of the jurisdiction of magistrates; of the manner of bringing actions, of compromises after an action is commenced: iii. explains what kind of persons are allowed to sue in law, and it defines who are styled infamous, and as such not permitted to sue: it then treats of advocates, proctors, syndics, and other counsellors: iv. treats of restitution, compromises, and arbitrations, after which it speaks of innkeepers and others in whose custody we leave anything: v. treats of trials: and complaints against inofficious (inofficiosa) testaments: vi. treats of real actions and their various kinds to recover one's property: vii. treats of personal services (servitutes, as usus fructus): viii. speaks of real services both in town and country: ix. treats of personal actions which are in imitation of real actions, as actions for a fault or crime committed by a slave, the action of the lex Aquilia, and the action against those who throw any thing into the highway by which any one is wounded or injured: x. treats of mixed actions, the action of partition of an inheritance, &c: xi. speaks of interrogatories, and of such matters as are to be heard before the same judge (judex). It also treats of run-away slaves, of dice-playing, bribery, corruption, and false reports; and lastly, of burials and funeral expenses: xii. explains the action for a loan, condictions, &c.: xiii. continues the subject of the preceding, and treats of the action of pawning: xiv. and xv. treat of actions arising from contracts made by other persons and yet binding upon us; of the Senatus Consultum Macedonianum; and of the peculium: xvi. treats of the Senatus Consultum Velleianum, and of compensation, and the action of deposits: xvii. treats of the mandate, and of partnership (societas): xviii. explains the meaning and forms of the contract of sale, the annulling of this kind of contract; and treats of gain or loss upon the thing sold: xix. treats of bargains, of actions of hiring, of the action called æstimatoria, of permutation, of the action called præscriptis verbis, &c.: xx. treats of pledges and hypothecæ, of the preference of creditors, of the distraction or sale of things engaged or pawned: xxi. contains an explanation of the Ædile's edict concerning the sale of slaves and beasts, and also treats of evictions, warranties, &c.: xxii. treats of interest (usuræ), fruits, accessions to things, and of proofs and presumptions, and of ignorance of law and fact: xxiii. is upon betrothment (sponsalia), marriage, dowry, and agreements upon this subject, and lands given in dowry: xxiv. treats of gifts between husband and wife, divorces, and recovery of the marriage portion: xxv.

treats of expenses laid out upon the dowry, of actions for the recovery of things carried away by the wife or other person against whom there is no action for theft, of the obligation to acknowledge children and provide for them, on the Rescript De Inspiciendo Ventre, and lastly of concubines: xxvi. and xxvii. treat of tutorship and curatorship, and the actions resulting from them: xxxviii. treats of testaments, of the institution and disinheriting of children, of the institution of an heir, of substitutions, &c.: xxix. treats of military testaments, of the opening of wills, and of codicils: xxx., xxxi., xxxii. treat of legacies and fiduciary bequests in general: xxxiii. and xxxiv. treat of particular legacies, of the ademption of legacies, and of the Regula Catoniana: xxxv. treats of legacies on condition, and of the Lex Falcidia: xxxvi. treats of the Senatus Consultum Trebellianum, and of fiduciary bequests, of the time when they become due, of the security to be given by the heir, &c.: xxxvii. treats of universal succession by bonorum possessio: xxxviii. treats of the services due by freedmen to their patrons, of the succession of freedmen, of the succession of intestates appointed by the prætor, of heredes Sui and Legitimi, and of the Senatus Consultum Tertullianum and Orphitianum: xxxix. explains the means which the law or the prætor provides for preventing any one from receiving damage where a personal, real, or mixed action will not lie, after which it ends with the explanation of donations generally, and of such as are made in contemplation or view of death (mortis causâ): xl. relates to manumission or freeing of slaves: xli. treats of the various ways by which the property of things is acquired, and of the acquisition and loss of possession, and lastly of lawful causes which authorize possession and lead to usucaption: xlii. treats of definitive and interlocutory sentences, of confessions in judgment, of the cession of goods, of the causes of seizure and their effects, of the privileges of creditors: of curators appointed for the administration of goods, and of the revocation of acts done to defraud creditors: xliii treats of injunctions (interdicta) and possessory actions: xliv. speaks of pleas (exceptiones) and defences, and of obligations and actions: xlv. of stipulations, &c.: xlvi. of sureties, novations, delegations, payments, discharges, prætorian stipulations, &c.: xlvii. treats of private offences: xlviii treats of public offences; then follow accusations, inscriptions, prisons; and lastly it treats of torture, punishments, confiscation, relegation, deportation, and of the bodies of malefactors executed: xlix. treats of appeals; and then gives an account of the rights of the exchequer, and of matters relating to captives, military discipline, soldiers and veterans: l. treats of the rights of cities and citizens, of decuriones and their children, of public offices, of immunities, of deputies and ambassadors; of the administration of things belonging to cities, of public works, fairs, &c.; of taxes laid upon the provinces, and lastly it concludes with the interpretation and signification of legal terms, and with the rules of law.

Of the merits and imperfections of the 'Digest,' Cujas, Hotomannus, Heineccius, Gravina, Schulting, Bynkershoek, and many others have amply spoken. With all its faults it is a noble work, and much superior to the Code in its style, matter, and arrangement; it has, in great measure, embodied the wisdom of the most learned men of the best age of the Empire, men who grounded their opinions on the principles of reason and equity, and who for the most part were personally unconcerned and disinterested in the subjects on which they gave their responsa. Tribonian and his colleagues are charged with making many interpolations, with altering many passages in the writings of their predecessors, substituting their own opinions, and passing them off to the world under the name of the antient jurists. Justinian himself acknowledged that he was obliged to accommodate the old jurisprudence to the altered state of the times, and to 'make the laws his own.' Another charge, which is however unsupported by evidence or probability, is, that Justinian and his civilians purposely destroyed the old text books that had served them for the compilation of the 'Pandects.' Long however before Justinian's time, the works of the antient jurists were partly lost, and the vicissitudes of the ages that followed may easily have obliterated the rest. While the Digest was being compiled, Justinian commissioned Tribonian and two other civilians, Theophilus and Dorotheus, to make an abridgment of the first principles of the law, for the use of young students who should wish to apply themselves to that science. This new work, being completed, was published under the name of 'Institutiones,' about one month before the appearance of the Digest. The Institutions were mainly based on an older work of the same description and title. [GAIUS.] They are arranged in four books, subdivided into titles. As the law has three objects, persons, things, and actions, the first book treats of persons or status; the second and third, and first five titles of the fourth, treat of things; and the remaining titles of the fourth book treat of actions. [ROMAN LAW.]

Besides these three compilations, the Code, the Institutes, and the Digest, Justinian, after the publication of the second edition of his Code, continued to issue new laws or constitutions chiefly in Greek upon particular occasions, which were collected and published together after his death under the name of Νεαραί Διατάξεις, or Novæ or Constitutiones Novellæ, or Authenticæ. The Novellæ are divided into nine Collationes and 168 Constitutiones, or, as they are now often called, novels. The Novellæ, together with thirteen Edicts of Justinian, make up the fourth part of his legislation. There are four Latin translations of the Novellæ, two of which were made soon after Justinian's death; the third is by Haloander, printed at Nürnberg in 1531; and the fourth was printed at Basel by Hervagius in 1561. This first translation is that which is printed in the editions of the Corpus Juris opposite to the Greek text, and is very valuable, notwithstanding it has been stigmatized by some with the name 'barbarous:' it is sometimes called Authentica Interpretatio or Vulgata. The version of Haloander is also printed in some editions of the Corpus Juris. The Novellæ made many changes in the law as established by Justinian's prior compilations, and are an evidence that the emperor was seized with a passion for legislating; a circumstance which enables us to form a more correct judgment of his real merits, and lowers his character as a philosophic jurist.

A few words on Tribonianus, who was so mainly instrumental in the compilation of Justinian, may not be misplaced here. He was a native of Pamphylia, and his father was from Macedonia. His learning was most extensive: he wrote upon a great variety of subjects, was well versed both in Latin and Greek literature, and had deeply studied the Roman civilians, of which he had a valuable collection in his library. He practised first at the bar of the prætorian prefects at Constantinople, became afterwards quæstor, master of the imperial household, and consul, and possessed for above twenty years the favour and confidence of Justinian. His manners are said to have been remarkably mild and conciliating; he was a courtier, and fond of money, but in other respects he appears to have been calumniated by his enemies. He was a superior man, and most valuable to Justinian. His death took place A.D. 545. (Ludewig, *Vita Justiniani Magni atque Theodoræ, nec non Triboniani*, Halle, 1731; Zimmern, *Geschichte des Römischen Privatrechts bis Justinian*, Heidelberg, 1826; Hugo, *Lehrbuch der Geschichte des Römischen Rechts*, Berlin, 1832; *History of the Roman or Civil Law*, by Ferriere, translated by J. Beaver, London, 1724; Hommelii, *Palingenesia*; Brinkmannus, *Institutiones Juris Romani*, Schleswig, 1822; *System des Pandekten Rechts*, by Thibaut, 7th ed., Jena, 1828; *Das Corpus Juris in's Deutsche übersetzt von einem Vereine Rechtsgelehrter und herausgegeben von* Otto, Schilling und Sintenis, Leipzig, 1831; *Les Cinquante Livres du Digeste, &c., Traduits en Français par feu* M. Henri Hulot, Paris, 1805; *Pandectes de Justinien mises dans un nouvel ordre, &c., par R. J. Pothier, traduites par Bréard Neuville, revues et corrigées par* M. Moreau de Montalin, Avocat, Paris, 1810; Pothier's edition of the *Digest*, reprinted at Paris in 5 vols. 4to., 1818—20, is a useful edition; there is a very cheap edition of the *Corpus Juris* recently published in Germany, by Beck, 3 vols. small fol., Leipzig, 1829; the editions of the Corpus Juris and of the Institutes are very numerous.) [CORPUS JURIS; GAIUS.]

JUSTINIA'NUS, FLA'VIUS, born near Sardica in Mœsia, A.D. 482 or 483, of obscure parents, was nephew by his mother's side to Justinus, afterwards emperor. The elevation of his uncle to the imperial throne, A.D. 518, decided the fortune of Justinian, who, having been educated at Constantinople, had given proofs of considerable capacity and application. Justinus was ignorant and old, and the advice and exertions of his nephew were of great service to him during the nine years of his reign. He adopted Justinian as his colleague, and lastly, a few months before his death, feeling that his end was approaching, he crowned him in presence of the patriarch and senators, and made over the imperial authority to him, in April, 527. Justi

nian was then in his forty-fifth year, and he reigned above thirty-eight years, till November, 565, when he died. His long reign forms a remarkable epoch in the history of the world. Although himself unwarlike, yet by means of his able generals Belisarius and Narses he completely defeated the Vandals and the Goths, and re-united Italy and Africa to the empire. Justinian was the last emperor of Constantinople who, by his dominion over the whole of Italy, re-united in some measure the two principal portions of the antient empire of the Cæsars. On the side of the East the arms of Justinian repelled the inroads of Khosroes, and conquered Colchis; and the Negus or king of Abyssinia entered into an alliance with him. On the Danubian frontier the Gepidæ, Longobards, Bulgarians, and other hordes were either kept in check or repulsed. [BELISARIUS.] The wars of Justinian's reign are related by Procopius and Agathias.

Justinian must be viewed also as an administrator and legislator of his vast empire. In the first capacity he did some good and much harm. He was both profuse and penurious; personally inclined to justice, he often overlooked, through weakness, the injustice of subalterns; he established monopolies of certain branches of industry and commerce, and increased the taxes. But he introduced the rearing of silkworms into Europe, and the numerous edifices he raised, the towns he repaired or fortified, attest his love for the arts, and his anxiety for the security and welfare of his dominions. Procopius, 'De Ædificiis Domini Justiniani,' gives a notice of the towns, temples (St. Sophia among the rest), convents, bridges, roads, walls, and fortifications constructed or repaired under his reign. The same Procopius however wrote a secret history ('Anecdota') of the court and reign of Justinian and his wife Theodora, both of whom he paints in the darkest colours. Theodora indeed was an unprincipled woman, with some abilities, who exercised, till her death in 548, a great influence over the mind of Justinian, and many acts of oppression and cruelty were committed by her order. But yet the 'Anecdota' of Procopius cannot be implicitly trusted, as many of his charges are evidently misrepresentations or malignant exaggerations. Justinian was easy of access, patient of hearing, courteous and affable in discourse, and perfect master of his temper. In the conspiracies against his authority and person he often showed both justice and clemency. He excelled in the private virtues of chastity and temperance; his meals were short and frugal: on solemn fasts he contented himself with water and vegetables, and he frequently passed two days and as many nights without tasting any food. He allowed himself little time for sleep, and was always up before the morning light. His restless application to business and to study, as well as the extent of his learning, have been attested even by his enemies ('Anecdota,' c. 8, 13). He was or professed to be a poet and philosopher, a lawyer and theologian, a musician and architect; but the brightest ornament of his reign is the compilation of Roman law [JUSTINIAN'S LEGISLATION] which has immortalized his name. Unfortunately his love of theological controversy led him to interfere with the consciences of his subjects, and his penal enactments against Jews and heretics display a spirit of mischievous intolerance which has ever since afforded a dangerous authority for religious persecution.

Justinian died at eighty-three years of age, on the 14th November, 565, leaving no children, and was succeeded by his nephew Justinus II. (Ludewig, *Vita Justiniani Magni;* Gibbon, ch. xl.-xliv.)





Coin of Justinian.
British Museum. Actual Size.

JUSTINIANUS II., son of Constantine III., a lineal descendant of the Emperor Heraclius, succeeded his father on the throne of Constantinople, A.D. 685. His reign, which lasted ten years, was marked chiefly by wars with the Saracens, and by the exactions and oppressions of his ministers. At last his general Leontius drove him from the throne, had his nose cut off, and banished him to the Crimea, A.D. 695. Leontius however was soon after deposed himself and banished by Tiberius Apsimerus, who reigned for seven years. Meantime Justinian had escaped from the Crimea, and married the daughter of the Kakan, or king of the Gazari, a tribe of Turks; and he afterwards, with the assistance of the Bulgarians, entered Constantinople, and put to a cruel death both Leontius and Tiberius, with many others. He ordered also many of the principal people of Ravenna to be put to death. At last Justinian was dethroned and killed by Philippicus Bardanes, A.D. 711.

JUSTI'NUS I., by birth a peasant of Dacia, in his youth enlisted in the guards of the emperor Leo I. Under that and the two following reigns Justin distinguished himself by his military services, and gradually attained the rank of tribune, count, general, and lastly the command of the guards, which he held when the emperor Anastasius died, A.D. 518. He was then proclaimed emperor by the soldiers, being sixty-eight years of age, and the clergy and people approved the choice. Justinus, being himself uninformed in civil affairs, relied for the despatch of the official business of state on the quæstor Proclus, a faithful servant, who was also the friend of Justinian, Justin's nephew, who himself had acquired a great ascendency over his uncle. By Justinian's advice a reconciliation was effected between the Greek and the Roman churches, A.D. 520. The murder of Vitalianus, who had been raised to the consulship, but who, having excited the suspicion and jealousy of the court, was stabbed at a banquet, casts a dark shade upon the character of both Justin and Justinian. In other respects Justin is represented by the historians as honest and equitable, though rude and distrustful. After a reign of nine years, being afflicted by an incurable wound, and having become weak in mind and body, Justin abdicated in favour of his nephew, and died soon after, in A.D. 527.

JUSTINUS II., nephew of Justinian I., by his mother Vigilantia, was raised to the throne by the senators and the guards immediately after the death of his uncle, on the 15th November, A.D. 565. Soon after complaints reached Constantinople from the Romans against Narses the conqueror of the Goths, and exarch of Ravenna, whose great qualities were stained with avarice, and whose government had become unpopular in Italy. A new exarch, Longinus, was appointed to supersede Narses, and the empress Sophia, Justin's consort, added to the letters of recal the insulting message, that the eunuch Narses should leave to men the exercise of arms and the dignities of the state, and return to his proper place among the maidens of the palace, where a distaff should be placed in his hand. To this insult Narses is said to have replied, 'I will spin her such a thread as she will not easily unravel;' and he is said to have invited the Longobards, and their king Alboin, to invade Italy. However this may be, Alboin invaded Italy by the Julian Alps, A.D. 568, and in a few years all North Italy was lost to the Byzantine emperor. The provinces of Asia were likewise overrun by the Persians. Internal discontent prevailed in the capital and provinces, owing to the malversations of the governors and magistrates, and Justin himself, deprived by infirmity of the use of his feet, and confined to the palace, was not able to repress abuses and infuse vigour into the administration. Feeling at last his impotence, he resolved on abdicating the crown, and as he had no son, he chose Tiberius, the captain of his guards, as his successor. The conduct of Tiberius fully justified Justin's discernment. Justin lived four years after his abdication, in quiet retirement, and died in the year 578.





Coin of Justinus I. or II.
British Museum. Actual Size.

JUSTI'NUS, commonly called JUSTIN, MARTYR, one of the early fathers of the Christian church, and considered one of the ornaments of the body of men who professed the Christian faith in the times of its great discouragement while it was making head against the power of the Gentile world.

He was born in Palestine, at a place then called Neapolis, a new city, as may be inferred from its name, which had arisen near the antient town of Sichem, of which we read in the Old Testament, if it were not Sichem itself with a new name. His father was a Greek. Justin was carefully instructed in the learning of the Grecian schools of philo-

sophy, in the course of his studies visiting Alexandria, then a celebrated seat of learning; and travelling much in Egypt. With a mind deeply embued with the Platonic philosophy, he became sensible to the truth and beauty of Christianity, and made a public profession that he received it as divine truth. This was about the year A.D. 132.

During the remainder of his life he continued in the profession of Christianity, and is distinguished among the fathers of the church by the apologies and defences which he published. His first apology for Christianity was addressed to the emperor Antoninus, at a time when the Christians were suffering rather from popular fury than from the bearing upon them of the regular authority of the state, and it prevailed so far as to obtain for them some favourable concessions from the emperor. His second apology was addressed to the successor of Antoninus, Marcus Aurelius, on occasion of several Christians having been put to death for their faith. Both these apologies are extant; as well as another work of Justin's, which is a dialogue with Trypho, a learned Jew, in defence of Chistianity. Of the genuineness of these works there is no doubt. There is also another work of his 'On the Unity and Sovereignty of God;' but great suspicions are entertained of the genuineness of some other writings which have been attributed to him.

We have now to relate his end. The usual place of his residence was Rome, where, in or about A.D. 164, he was put to death a martyr to Christian truth. It was eminently as a martyr or witness that he suffered; for he might have saved his life had he consented to join in a sacrifice to the heathen deities. Hence with his name has descended the addition of The Martyr, a distinction which in a later age was given to Peter, one of the Protestant sufferers for the truth.

'The Dialogue with Trypho' was edited by Dr. Samuel Jebb, and the 'Apologies' by Dr. Charles Ashton, two learned Englishmen of the last century. Among the best editions of the whole works of Justin may be named that of Stephens, folio, 1551, and that of Oberthür, 2 vols. 8vo., 1777. There are English translations of the Apologies by William Reeve, M.A., 2 vols. 8vo., 1809; and of the Dialogue by Henry Brown, M.A., 1755.

Middleton in his 'Free Inquiry' has various remarks on this father, whose intellectual character and acquirements he rates very low (p. 27, &c).

JUSTI'NUS, the historian, is supposed to have lived under Antoninus Pius, as it would appear from the preface to his History, which he addresses to that emperor. The passage in which the emperor's name occurs is found in the older editions, but its authenticity is disputed. Nothing else is known of his personal history. He compiled an abridgment or epitome of the Universal History of Trogus Pompeius, who lived in the time of Augustus, and which consisted of forty-four volumes, as Justin tells us in his preface. The work of Trogus is unfortunately lost, except the prologi or heads of contents of each book, from which it appears that Justinus has been at times a careless abbreviator, having entirely omitted several interesting subjects which were treated by Trogus, such as in book i., the account of the Æolian and Ionian cities in Asia, of the origin of the Tusci or Etrusci in Italy, and of the cities of Egypt. Another charge against Justinus is the confused order in which he has narrated events, but this fault may be ascribed to the text of Trogus. Book i. treats of the Assyrians from Ninus to Sardanapalus, and of the Medians, Lydians, and Persians to Darius Hystaspes. The next five books are occupied by the history of the Greek and Persian wars; but by far the largest part of the work, from book vii. to book xvii. inclusive, is engrossed by the history of the Macedonian kingdom and empire, before and after Alexander. Books xviii. to xxiii. treat of Carthage and Sicily; books xxiv. to xl. treat of Greece, Macedonia, Asia, and Egypt, under the successors of Alexander down to the Roman conquest; books xli. and xlii. treat of the Parthians; book xliii. treats of the origin of Rome and of Massilia (Marseille); and the last book is upon the history of Spain. Book xxxvi., in which the author speaks of the Jews, has been commented upon by J. J. Schudt, in his 'Historiæ Judaicæ ex Gentilium Scriptis Collectæ,' 8vo., Frankfort, 1700. Among the best of the numerous editions of Justinus may be mentioned that by Abr. Gronovius, with variorum notes and dissertations, 1719, reprinted in 1760; that of J. G. Græveius, Leyden, 1683; that of the Bipontine Society, 1802; and that of Wetzel, 1806.

JUTES, an old Teutonic or Scandinavian tribe which in the fifth century of our æra appear as being settled in the northern part of the Chersonesus Cimbrica, which is still called, after their name, Jutland. Mannert (*Geographie der Griechen und Römer*) thinks that they were a colony from the opposite coast of Scandinavia, of the same race as the Guthi, or Gutæ, mentioned by Ptolemy. [GOTHS.] The first Germanic invaders of Britain after the departure of the Romans were Jutes, who, under their leaders Hengist and Horsa, A.D. 455, landed in the Isle of Thanet and settled in Kent. The Saxons under Ella came A.D. 477, and the Angles did not come till the following century. [ENGLAND.]

JUTLAND is the name of a large province of the kingdom of Denmark. The name was formerly given to the whole of the peninsula, which constitutes the continental portion of the kingdom. At present the name is restricted to the northern half, which is sometimes called North Jutland, the Duchy of Schleswig being considered as South Jutland. North Jutland is situated between 55° 20′ and 57° 42′ N. lat. and 8° 6′ and 10° 50′ E. long. Its form as far as 55° 12′ is a pretty regular parallelogram lying nearly due north and south: the northern part is almost a right angled triangle. The extreme length is about 170 miles; the breadth of the parallelogram varies from 70 to 85 miles, but in the centre it is 100 miles, the district of Kalloe projecting towards the east. It is bounded on the west and north by the German Ocean, on the east by the Cattegat and the Little Belt, and on the south by Schleswig. The area is 9408 square miles, and the population about 525,900. Few countries have such an extensive line of coast in proportion to their area as the Danish peninsula, which, especially on the more elevated east coast, is indented with numerous bays and inlets, and no town is above 45 miles from the sea. The most considerable of these inlets, the Lymfiord, extends across the peninsula. The entrance is on the east side, in lat. 57° and long. 10° 10′ E. It runs west to about 9° 20′, where it suddenly expands, forming as it were a large lake, stretching in a south-west direction to 56° 30′, where it turns to the north-west and reaches 56° 45′, the whole length being about 100 miles. It contains numerous islands, the largest of which, called Mors, situated in the broad part, has an area of 136 square miles and a population of 7800 inhabitants. In the year 1825 the North Sea broke through the narrow strip of land which separated it from the Lymfiord, and the breach being gradually enlarged, the northern part of Jutland is now a complete island. The apparent advantage of this extensive line of coast is much diminished by the shallowness of the sea, and the innumerable little islands, sandbanks, and shoals which render access difficult. The north coast, besides an immense range of sandbanks rising almost to the surface of the water, is rendered dangerous to navigators by numerous currents and the shortness and rapidity of the waves. The west coast, facing the German Ocean for above 200 miles, is bordered by a narrow strip of moving sand and a chain of sand-hills, within which there are many good pastures. The southern part of the west coast is alluvial soil, extremely fertile, but swampy and unhealthy, and requiring dikes to protect it from the inroads of the German Ocean, which however sometimes breaks through them, as happened in 1634, when 15,000 persons perished. The east coast is more elevated, rising in chalk-cliffs above the sea, and to the south of Aarhuus it presents a series of fertile and well-cultivated eminences. The province in general is very deficient in natural beauties. The only elevations are a range of low hills, seldom rising above a few hundred feet: they are the prolongation of the chain which runs through Mecklenburg and Holstein, and thence extends through the whole peninsula, terminating at its extreme northern point, the promontory of Skagen. Only the Himmelsberg attains the height of 1200 feet. The rivers are very small, and are all called 'aae;' the largest are, the Scholmaae, Widaae, Bredeaae, and Ribsaae. With respect to the soil, 5426 square miles are arable land, 2719 heath, 715 meadows and marshes, 313 forests, and about 235 tracts of moving sand. The productions are corn (more than sufficient for the inhabitants), hemp, flax, tobacco, and some timber. In the tenth and eleventh centuries the country was covered with vast forests, and there are still considerable woods of oak, fir, beech, &c. on the east coast, but on the west there are only willow, beech, and alder. The horses are large, but fitter for draught than for riding. The breed of black cattle is good,

and numbers of them and of hogs are exported to Holstein. There is abundance of game, and some wild boars are still found in the forests. The lakes, gulfs, and bays afford an inexhaustible supply of fish. The climate, through the proximity of the sea, is more temperate than might be supposed from the latitude. It is very variable, with frequent fogs and rains; the winters are not very rigorous, but the summer is often extremely hot. The inhabitants are in general illiterate, credulous, and indifferent to improvement. Till the ninth century the Jutes, from whom the country has its name, were governed by their own princes, two of whom, Gotice and Hemming, carried on war with Charlemagne. In the second half of the ninth century the country was conquered by Gormo Gammut, king of Denmark, who annexed it to his own dominions.

The peninsula is divided into four large districts called *stifts*, in this instance equivalent to diocese or bishopric:—Aalborg in the north, Aarhuus in the east, Wiborg in the centre, and Ripen in the south and west. The first two have been already described. Wiborg has an area of 1050 square miles and 85,000 inhabitants. The capital, of the same name, is situated on a small lake nearly in the centre of the peninsula, and has 4000 inhabitants. It is about 2¼ miles in circuit, is surrounded with ramparts, has six gates, and is pretty well built. There are a cathedral and two other churches, and a few manufactories. The bishopric of Ripen, or Ribe, the most extensive of all, has an area of 3842 square miles, but is in proportion the least populous, having only 150,000 inhabitants. Ribe, the capital and seat of the bishop, is a small walled town with 3000 inhabitants. It is situated on a little river called the Ribsaae, two miles from the German Ocean. Only small vessels can come up to the town, which has some trade in corn, oxen, and horses. There is one church besides the cathedral, and the oldest Latin school in Denmark (founded in 1248), with a library. Fredericia, the only fortress in Jutland, is in this diocese; it is situated on the Little Belt, has 4700 inhabitants, a Calvinist, a Roman Catholic, and two Lutheran churches, a synagogue, a custom-house for ships passing through the Little Belt, and other public buildings, and several manufactories.

JU'VENAL. Of the personal history of this great poet scarcely anything appears to be certainly known. His name is variously written Decius, or Decimus, Junius Juvenalis. His birthplace, on no very sure ground, is said to have been Aquinum, a Volscian town; and he is said to have been born somewhere about A.D. 40, under Caligula, and to have died, turned of 80, under Hadrian. He was of obscure extraction, being the grandson of an enfranchised slave. Some of his biographers say that he followed the profession of a pleader. He was intimate with the poet Martial. (Martial's *Ep.*, vii. 24, 91; xii. 18.) It does not appear that he gained any reputation until the publication of his Satires, which was late in life, after he was turned sixty. Still later he was sent in command of a cohort of infantry to Egypt, where he died from vexation and weariness of this honourable exile, which it is said was inflicted upon him as a punishment for satirizing a favourite of Hadrian under the person of Paris, the favourite actor of Domitian. See *Sat.* vii. 88, where Paris is described as the bestower of military patronage.

The relative merits of Juvenal and Horace as satirists have been warmly contested. It is a question on which men will form opposite opinions, as their tempers are more fit to relish brilliancy and playfulness, or earnest and dignified declamation. Juvenal is said to have spent much time in attendance in the schools of the rhetoricians, and the effect of this, in an age not remarkable for purity of taste, may be observed perhaps in a tendency to hyperbolical inflation, both of thought and style, which would soon betray a writer of less power into the ridiculous. From this his wit, command of language, and force and fullness of thought, completely preserve him: still perhaps he would produce more effect if the effort to do his utmost were less apparent. Dryden says, 'Juvenal gives me as much pleasure as I can bear. He fully satisfies expectation; he treats his subject home. His spleen is raised, and he raises mine: I have the pleasure of concernment in all he says. He drives his reader along with him, and when he is at the end of his way I willingly stop with him. If he went another stage it would be too far, and turn delight into fatigue. When he gives over 'tis a sign the subject is exhausted, and the wit of man can carry it no farther. If a fault can justly be found in him, 'tis that he is sometimes too luxuriant, too redundant.' His writings are addressed to the encouragement of virtue not less than to the chastisement of vice; and parts of them have been recommended by Christian divines as admirable storehouses of moral precepts. Still they lie open to the objection of descending so minutely into the details of vice as to minister food as well as physic to the depraved mind. To the scholar they are invaluable for the information which they supply concerning private life among the Romans. The editions of Juvenal are very numerous; that of Ruperti has (in England at least) nearly superseded others: it is attended by a copious body of explanatory notes, which are much needed in reading this difficult author. He is translated into English by Holiday, Dryden (who however only translated five satires of the edition which bears his name), Gifford, and Hodgson. The French prose translation of Dusaulx is highly praised. [DRYDEN; GIFFORD.] (*Proemium to* Ruperti's *Juvenal; Dedication to* Dryden's *Juvenal.*)

JYENAGUR, or JEYPORE, a principality in Rajpootana, lying between 26° and 28° N. lat., and between 75° and 78° E. long. On the west it is bounded by the British possessions in the same province, and on all other sides is contiguous to other Rajpoot territories. The surface of the country is in general level; the hills do not in any case acquire the size of mountains. The soil is for the most part sandy and arid, and in many places is strongly impregnated with salt, a considerable quantity of which is manufactured both for home use and for exportation. During the dry season, from February to July, the heat is excessive, and the clouds of hot sand which are driven about by the wind are so annoying as nearly to prevent travelling, and confine the inhabitants as much as possible within their dwellings. The cultivated fields are watered by means of wells, there being no permanent streams, and those produced by the rains being of little use for the purpose of irrigation during the dry season. The principal articles of produce are cotton, tobacco, and wheat, with some smaller grains. Cattle are reared for draught, and sheep for their wool. Jyenagur is more populous than most of the other Rajpoot states, and contains numerous forts in every part of the country; a great proportion of the villages also are defended by walls, and surrounded by ditches, notwithstanding which the inhabitants formerly suffered so severely from the incursions of plunderers, that so recently as 1819 the country had the appearance of being an extensive waste, in which large herds of cattle and of deer roamed about without restriction. Since that time a state of greater security has prevailed, cultivation has been resumed, the population has increased, and the public revenue, which had been almost annihilated through the general disorganization, now yields about 800,000*l.* per annum.

Jeypore, the capital, is situated in 26° 54′ N. lat. and 75° 38′ E. long., about 156 miles south-west from Delhi. The town is placed in a valley open to the south, and is surrounded by a wall of grey stone; it is well and regularly built, with four principal streets, which meet in a large square. The houses are three or four stories in height, and many of them are decorated with paintings in *fresco*, sculptures, porticoes, and other ornamental works executed in marble. Most of the dwellings are separate and built at equal distances; they are connected by means of a low wall. The temples, although modern, are built in the purest style of Hindu architecture, and some of them are of large dimensions. The distance of this city from Agra is 136 miles; from Benares 515 miles; from Bombay 740 miles; from Calcutta 975 miles; and from Delhi 156 miles—all travelling distances.

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VOLUME XIII.

K

K has the same sound which C has before the vowels *a, o, u*. A reference to that consonant will therefore suffice for the power of the letter; its various forms may be seen in ALPHABET. Although this letter is now superfluous, it was not so when the characters of an alphabet were syllabic in power. Thus the letter *k* appears to have denoted at one time the syllable *ka*, while another character represented *ko*, and so on. Hence in the Greek and Hebrew alphabets the former was called *kappa, kaph;* the latter *koppa, koph*. This accounts for the fact, that in Latin the letter *k* was never used except before the vowel *a*, precisely as *q* is found only before *u*, and the Greek koppa only before *o*. Even our own alphabet seems to imply such a limit in the use of this consonant, when it gives it the name *ka*, not *ke;* though the latter name would better agree with *be, ce, de*, &c.

KABYLES. [ALGIERS, vol. i., p. 327.]

KAEMPFER, ENGELBERT, well known as a botanist, and still more as a traveller, was born the 16th of September, 1651, at Lemgo, in the principality of Lippe-Detmold, in Germany, where his father was rector of the church of S. Nicholas. He was sent successively to the schools of Hameln, Lüneburg, Hamburg, and Lübeck, in all which he was distinguished by his rapid progress in the antient languages, history, geography, and music. He was afterwards sent to the gymnasium of Danzig. He next studied at the university of Cracow, in Poland, for three years, and at Königsberg, in Prussia, for four years more. At the last-mentioned place he applied himself closely to the study of physic and natural history. From Prussia he went to Sweden, where the extent of his knowledge and his talents procured him very advantageous offers on condition of settling at Upsala; but his desire to see remote countries led him to decline the proposals, and he solicited and obtained the place of secretary to an embassy which was then going to Persia. The embassy passed through Moscow, Kasan, and Astrakhan, where they embarked for Persia, and landed at Nizabad, in Daghestan, on the western shores of the Caspian Sea. While they were waiting for their passports in the town of Shamaki, in Shirvan, Kaempfer made an excursion to the peninsula of Absheran: he was the first naturalist who visited this remarkable spot, its wells of naphtha, and its ever-burning fire, which he described in his 'Amœnitates Exoticæ.' In 1684 the embassy arrived at Ispahan, then the capital of Persia. The information which Kaempfer collected during a residence of two years at that place respecting Persia and its natural productions is embodied in his 'Amœnitates.' When the embassy returned to Europe in 1685 Kaempfer entered as surgeon into the service of the Dutch East India Company, and served in that capacity in the navy then cruising in the Persian Gulf. After a long illness at Bender Abassi, he sailed for Batavia in 1689, and in this passage visited most of the countries on the western shores of Hindustan. At Batavia he occupied himself chiefly with the natural history of the island of Java. In 1690 he set out from Batavia on his voyage to Japan, as physician to the embassy which the Dutch East India Company annually sent to the Japanese court. He embarked in the vessel which was to touch at the kingdom of Siam, and visited Judia, or Juthia, then the capital of that country. He remained at Nagasaki, in Japan, from September, 1690, to November, 1692, and during this time he accompanied two embassies to Yeddo. His observations on Siam and Japan are given in his great work entitled 'The History of Japan,' the original of which has never been published, but a translation was made from a copy in the possession of Sir Hans Sloane by J. G. Scheuchzer, and published in England in 2 vols. fol., 1727. Kaempfer returned from Japan to Batavia, which he left in 1693 for Amsterdam. In April, 1694, he took the degree of doctor of physic at the university of Leyden, and in the theses which he published on that occasion he showed that the *Agnus Scythica*, or *Barometz*, a pretended plant-animal, was nothing but a fiction he also describ[illegible] other remarkable objects, and among them the electrical eel. On his return to his native place his reputation soon procured him the honour of being appointed physician to his sovereign, a circumstance which brought him into extensive practice. This however was a loss to science. Of the various works which he designed to publish only his 'Amœnitates Exoticæ' appeared during his lifetime (in 1712). His 'History of Japan,' as already observed, appeared much later, and only in English, from which it was afterwards translated into German and French. He died on the 2nd of November, 1716, his health having been much impaired by his travels and some domestic calamities. If we consider the variety, extent, and accuracy of the information contained in Kaempfer, we may confidently place him at the head of those naturalists who, more than any other class of travellers, have enlarged our knowledge of natural history and geography, and he may be considered as the precursor of Tournefort, Pallas, Sir Francis Hamilton, and Alexander von Humboldt.

(Scheuchzer's *Life of Kaempfer*, in his translation of the *History of Japan*.)

KÆMPFE'RIA, a small genus of Indian Scitamineæ, or Zingiberaceæ of some authors, of which the species are indigenous to the islands of the Archipelago and the southern parts of the continent of India, as Bengal and the districts on its eastern frontier. All are furnished with tuberous roots like the turmeric and ginger plants. The spikes of the flowers are short and rising from the root, in some species before, in others with, and nestled among the leaves: all are highly ornamental, and *K. rotunda*, called by the natives *bhooi chumpa*, or *ground chumpa*, is much cultivated in gardens on account of the beauty and fragrance of its flowers. It was supposed to yield the round Zedoary of the shops, but incorrectly as Dr. Roxburgh thinks, since he considers his *Curcuma Zedoaria* to be the plant. So *K. Galanga* was, equally incorrectly, long supposed to yield the Galanga of the shops. [GALANGA.] It is a native of the mountainous districts beyond Chittagong, and there called *Kumula*, and is cultivated by the Mugs; by them it is sold to the people of Bengal, who use it as an ingredient in their betel. The roots possess an agreeable fragrant smell, and a somewhat warm, bitterish, aromatic taste. The Hindus use them, according to Dr. Roxburgh, not only as a perfume, but also medicinally. The roots of *K. angustifolia* are, according to the same authority, used as a medicine for cattle by the people of Bengal.

KAFFA, called also Feodosia, is a town built on the south-eastern shores of the Crimea, in 45° 2′ N. lat. and 35° 20′ E. long., on a wide open bay, which is more than twenty miles across. The town stands on the most western angle of this bay, and its harbour is protected by a projecting cape. In antient times the town was called Theodosia, and was one of the towns of the Greek kingdom of the Bosporus. [BOSPORUS.] According to the author of the 'Periplus of the Euxine' it was a Milesian colony. Its importance appears to date from the time of Leucon, the contemporary of Demosthenes, who made it a port, and gave certain advantages to Athenian ships which came there for the purpose of carrying grain back to Athens. According to the author of the Periplus (who probably lived in the second century of the Christian æra), it was then called Ardauda in the Alan or Tauric dialect, which name signifies 'the seven gods.'

In the middle ages it seems to have been a considerable place, but especially so between the twelfth and fourteenth centuries, when it was in possession of the Genoese, who carried on a considerable commerce with India through Persia from this town. In 1474 it was taken from the Genoese by the Turks, but still continued a considerable place, though its population had decreased from 80,000, which it is stated to have had when the commerce of the Genoese was most flourishing, to 20,000 individuals. The wars which the Russians, in the latter half of the last century, carried on in these parts, ruined Kaffa, and still more the emigrations

which took place when the Russians got possession of the town. Towards the end of the last century Pallas describes it as a heap of ruins, enclosed by strong and lofty walls, which were fortified by towers, at the distance of 20, 40, and 60 fathoms from each other. The space enclosed by these walls is an oblong square along the bay, more than an English mile in extent. Among its ruins Pallas observed a large mosque, which was then used as the chief guard-house. In this ruined state the town, whose population at present probably does not exceed 5000 souls, remained up to the year 1806, when Russia tried to raise it again by declaring it a free harbour, and by establishing a quarantine, an assurance company, a botanic garden, a museum of antiquities, which are frequently found in the neighbourhood, a library, &c.; but the effect of these efforts seems not to have been great, for in 1830 the exports did not exceed 1,148,288 rubles, nor the imports 890,910 rubles, in paper money. Fishing is the principal occupation of the inhabitants. In its neighbourhood are oysters. Caviar is made here, as well as a small quantity of tobacco. It exports a great quantity of salt.

(Pallas, *Travels through the Southern Provinces of Russia;* Jones's *Travels in Norway, Sweden, Finnland, &c.;* Lyall's *Travels in Russia, the Crimea, &c.;* Demosthenes, *Leptin.*, c. 9; Strabo, vii., pp. 309, 311; Steph. Byzant. *Θευδοσία.*)

KAHIRA, or CAIRO, more properly *El Ckáhireh*, which was its former name, but now called by the natives *Musr*, the capital of modern Egypt, is situated in 30° 5′ N. lat. and 31° 20′ E. long., in a plain midway between the right or eastern bank of the Nile and the ridge of Mokattam, and near the apex of the Delta of the Nile. The tract of land between the town and the river, which is above a mile in width, in the direction of Boolak, the northern harbour of Kahira, becomes narrower farther south, so as to be less than half a mile wide, in the direction of Musr el Ateeckah, the southern harbour or landing-place. Kahira occupies about three square miles; it is surrounded by a wall, the gates of which are shut at night, and is commanded by a large citadel situated at an angle of the town, on one of the lower elevations of the contiguous ridge, in which is the residence of the Pacha. The streets of Kahira are unpaved, irregular, and narrow; they are more like lanes than streets. The great thoroughfare streets have generally a row of shops on each side. Above the shops are apartments which do not communicate with them, and which are inhabited by private families. Most of the bye-streets have a wooden gate at each end, closed at night, and guarded by a porter within, who opens it to persons who require admittance. There are also many courts with several narrow lanes branching out of them, but no thoroughfare, and only one common entrance, with a gate, which is also closed at night. The external walls of the better sort of houses are cased to the height of the first floor with the soft calcareous stone of the neighbouring mountain. The superstructure, the front of which generally projects about two feet, is of burnt brick of a dull red colour, but often plastered. The roof is flat, and covered with a coat of plaster. The ground-floor apartments next the street have small wooden grated windows; but the windows of the upper apartments are mostly formed of turned wood lattice-work, which is so close that it shuts out much of the light and sun, but admits the air. In the better houses the windows are furnished with frames of glass in the inside, which are closed in the winter, for a penetrating cold is felt in Egypt when the thermometer is below 60°. The houses in general are two or three stories high, and most of them enclose an open unpaved court, into which the principal apartments look. In the court is a well of slightly brackish water, which filters through the soil from the Nile; and on its most shaded side are commonly two water-jars, which are daily replenished with water of the Nile, brought from the river in skins.

There are in the town three or four squares or open places of considerable extent, two of which are overflowed during the high floods of the Nile. Among the numerous mosques, four are distinguished for their size and architecture—that of Tooloon, which dates from the ninth century of our æra; that of El Hakim; that of El Azhar, with a splendid dome, and a college attached to it; and lastly, the mosque of Hhasaneyn, with its high dome, its two lofty minarets, and its marble and other ornaments. Among the other remarkable buildings are the public baths, of which there are between sixty and seventy in the town, several of them very spacious, handsomely ornamented and painted, externally and internally, the various apartments being paved with marble. The coffee-houses, which are very numerous, are extremely plain and unadorned. There are in Kahira numerous buildings called wekalehs, for the accommodation of merchants and their goods. These buildings are square or oblong, having an open court in the middle, with vaulted warehouses for merchandise on the ground-floor opening into the court, and lodgings above them. The shops in the streets are small square recesses or cells, about six or seven feet high and between four and six feet wide, in which there is just room enough for the seller and one or two customers. The public gardens consist of groves of orange and lemon trees and vines; and the cemeteries, both within and without the town, are also frequented as promenades.

The population of Kahira is reckoned at 240,000 inhabitants, of whom about 190,000 are native Mussulmans, 10,000 Copts, between 3000 and 4000 Jews, and the rest strangers from various countries. The police maintained in the metropolis is tolerably strict: punishments are arbitrary but lenient; convicted malefactors are mostly employed in the public works.

In the neighbourhood of Kahira are, Boolak, with the custom-house, the bazaar, the printing-press, a school or college, some silk manufactories and about 18,000 inhabitants; Musr el Ateeckah, where the town of Fostat, or Old Kahira, once stood, and where the vast granaries are now seen; Schoobra, with a country-house and fine gardens of the Pacha; Aboo Zabel, where is a school of medicine, anatomy, and surgery, and a large military hospital, all created by the present Pacha Mehemet Ali. Nearly opposite Kahira, on the left bank of the Nile, are the great pyramids of Jizeh.

Kahira still maintains the reputation of being the best school of Arabic literature; and for Mohammedan theology and jurisprudence the fame of its professors remains unrivalled. Schools for children are very numerous at Kahira: almost every mosque has a koottab, or day-school, attached to it, in which children are instructed in reading the 'Koran,' and, if required, in writing and arithmetic. The schoolmasters are mostly persons of very little learning. Those youths who propose to devote themselves to religious employment or the learned professions pursue their studies in a great college attached to the mosque of El Azhar, which has a considerable library. Besides the study of grammar, rhetoric, and versification, lectures are given on logic, theology, the exposition of the Koran, and the traditions of the Prophet; on religious, moral, civil, and criminal law, which is chiefly founded on the Koran and the traditions; arithmetic and algebra, &c. The instruction is gratis. The number of students is about 1500, from almost all parts of the Mohammedan world. The Azhar has lost the greater part of its revenues, the Pacha having seized the cultivable lands belonging to the mosques. The professors subsist by teaching in private houses, copying books, and on the presents which they receive from the wealthy. Besides this college or university, there are, an elementary school of arts and sciences at Casr el Ain, a school of administration to instruct those who are designed for civil offices, and a school of artillery and engineering. The Arabic spoken by the middle and higher classes at Kahira, though inferior in grammatical correctness and pronunciation to that of the Beduins of Arabia, is much superior to that spoken in Syria, and still more to that of the Moghrabins, or Barbary Arabs. (Lane's *Account of the Manners and Customs of the Modern Egyptians;* Wilkinson; Minutoli; Planat, *Histoire de la Régénération de l'Egypte*, Paris, 1830.)

KAHAU. (Proboscis Monkey.) [NASALIS.]

KAKOXENE, a mineral occurring in small crystals, which appear to be six-sided prisms terminated by pyramids, disposed in radiating tufts. Colour yellow of several shades, and sometimes brownish-red. Lustre silky, sometimes adamantine; adheres to the tongue, and has an earthy smell.

When placed on a hot coal it emits a green phosphoric light, and before the blowpipe on charcoal decrepitates: with borax forms a deep green-coloured glass, and with soda a blackish mass.

It occurs in clayey brown iron-stone at Zbirow, in Bohemia.

Analysis by Steinman:—

Phosphoric acid	17·86
Fluoric acid and water	25·95
Peroxide of iron	36·82
Alumina	10·01
Silica	8·90
Lime	0·15
	99·69

KALENDAR, a register or distribution of the year, accommodated to the uses of life; containing the order of days, weeks, months, festivals, &c., as they occur in the course of the year. It is so called from the *kalendæ*, or Kalends, which among the Romans denoted the first day of every month. The kalendar, being of civil institution, varies according to the different distributions of time in different countries. Those which we shall take more particular notice of are, the Roman, the Julian, the Gregorian, and the Reformed Kalendar: a slight mention of the others will be sufficient.

Romulus, according to tradition, formed what is deemed the original Roman kalendar, by which the year was divided into ten months only, consisting of an unequal number of days, and began with March. The total number of days was 304. It was however soon discovered that the civil year, as thus constituted, was much shorter than the solar year. Romulus therefore added two intercalary months to every year; but these months were not inserted in the kalendar, nor were any names assigned to them until the following reign. Some Roman antiquarians maintained that the old kalendar continued in use till the time of Tarquinius Priscus.

Numa, in imitation of the Greeks, divided the year into twelve months, according to the course of the moon, consisting in all of 354 days: according to Pliny (*Hist. Nat.* xxxiv. 7), he afterwards added one day more to make the number odd, which was thought a more fortunate number. But as ten days, five hours, forty-nine minutes (or rather forty-eight minutes fifty-eight seconds) were wanting to make the lunar year correspond to the course of the sun, he intercalated every other year an extraordinary month, called *Mensis intercalaris*, or *Mercedonicus*, between the 23rd and 24th of February. This month appears to have consisted alternately of 22 and 23 days during periods of 22 years, the last biennium in the 22 years being entirely passed over. The intercalation of this month was left to the discretion of the pontifices, who, by inserting more or fewer days, used to make the current year longer or shorter, as was most convenient for themselves or their friends; for instance, that a magistrate might sooner or later resign his office, or contractors for the revenue have longer or shorter time to collect the taxes. In consequence of this licence the months were transposed from their proper seasons; the winter months carried back into autumn, and the autumnal into summer. Some critics are of opinion that there is a reference to this confusion in one of Cicero's letters to his friend Atticus (x. 17).

Julius Cæsar, when he had made himself master of the state, resolved to put an end to this disorder, by abolishing the use of the intercalations; and for that purpose, B.C. 47, adjusted the year according to the course of the sun, and assigned to the months the number of days which they still contain. He also added an intercalary day to February every four years. [BISSEXTILE.] To make everything proceed regularly, from the 1st of the ensuing January, he inserted in the current year, besides the intercalary month of 23 days, which fell into it, two extraordinary months between November and December, the one of 33, the other of 34 days; so that this year, which was called the last year of *confusion*, consisted of fifteen months, or 445 days. (Sueton., *Vit. J. Cæs.*, c. 40.) These 67 days were inserted in order to set the year right, which was 67 days in advance of the true time.

All this was effected by the care and skill of Sosigenes, an astronomer of Alexandria, whom Cæsar had brought to Rome for that purpose; and a new kalendar was formed from his arrangement by Flavius, digested according to the order of the Roman festivals, and the old manner of computing the days by kalends, nones, and ides, which was published and authorised by the dictator's edict.

This is the *Julian* or Solar year, which continues in use to this day in all Christian countries, without any other variation than that of the *old* and *new style*, which was occasioned by a regulation of Pope Gregory XIII., A.D. 1582, who, observing that the vernal equinox, which at the time of the council of Nice, A.D. 325, had been on the 21st of March, then happened on the 10th, by the advice of astronomers caused ten days to be thrown out of the current year, between the 4th and 15th of October; and to make the civil year for the future to agree with the real one, or with the annual revolution of the earth round the sun, or, as it was then expressed, with the annual motion of the sun in the ecliptic, which is completed in 365 days, 5 hours, 49 minutes, he ordained that every 100th year should not be leap-year; excepting the 400th; so that the difference will hardly amount to a day in 7000 years, or, according to a more accurate computation of the length of the year, to a day in 5200 years.

This alteration of the style was immediately adopted in all Catholic countries; but not in Great Britain till the year 1752, when eleven days were dropped between the 2nd and 14th of September, so that this month contained only nineteen days; and thenceforth the new or reformed style was adopted, as it had been before in the other countries of Europe. The same year also another alteration was made in England, by which the legal year, which before had begun on the 25th of March, began upon the 1st of January; this alteration first took place on the 1st of January, 1752. (See the Statute, 24 Geo. II., ch. 23.) By this statute it was also enacted that the several years of our Lord 1800, 1900, 2100, 2200, 2300, or any hundreth years of our Lord which shall happen in time to come, except only every fourth hundredth year of our Lord, whereof the year 2000 shall be the first, shall not be deemed bissextile or leap-years, but shall be considered as common years, consisting of 365 days only; and that the years of our Lord 2000, 2400, 2800, and every other fourth hundredth year of our Lord from the year 2000 inclusive, and also all other years of our Lord which, by the present computation, are considered bissextile or leap-years, shall, for the future be esteemed bissextile or leap-years, consisting of 366 days: and that whereas according to the rule then in use for calculating Easter-day, that feast was fixed to the first Sunday after the first full moon next after the 21st of March; and if the full moon happens on a Sunday, then Easter-day is the Sunday after; which rule had been adopted by the general council of Nice; but that as the method of computing the full moons then used in the church of England, and according to which the table to find Easter prefixed to the book of Common Prayer is found, had become erroneous, it was enacted that the said method should be discontinued, and that from and after the 2nd of September, 1752, Easter-day and the other moveable and other feasts were henceforward to be reckoned according to the kalendar tables and rules annexed to the act, and attached to the books of Common Prayer.

It is not generally known that an effort was made to reform the kalendar in England, as early as the reign of Queen Elizabeth. On the 16th of March, 27 Eliz., A.D. 1584-5, a bill was read the first time in the House of Lords, entitled 'An Act giving Her Majesty authority to alter and new make a Kalendar according to the Kalendar used in other Countries.' It was read a second time on the eighteenth of that month, after which no notice occurs of the proposed measure.

The formation of the *Hebrew* kalendar is fixed by some to the same year as the council of Nice, A.D. 325: others have placed it in the year 360; and others as late as A.D. 500. Lindo however assures us that the Mishna compiled according to the Jewish account in the year A.D. 141 proves that the kalendar as used by the Jews in its present form, with the intercalary month, was generally known and followed at that time. For further information upon the Jewish kalendar the reader may consult Dr. Adam Clarke's *Commentary upon the Bible*, and Lindo's *Jewish Calendar*.

Two *Kalendars* are *in use in the East*: the Arabian, which is common to all the Mohammedan countries; and the Persian, the use of which is peculiar to that country. This last is founded on the Persian æra called 'Yezdegird.'

The last we shall mention is the *French Revolutionary Kalendar*. In September, 1793, the French nation resolved that the republic should form a new æra, and that a kalendar should be adopted on what were termed philosophical principles. The Convention therefore decreed, on the 24th of November, 1793, that the common æra should be abolished in all civil affairs: that the new French æra should com-

mence from the foundation of the republic, namely, on the 22nd of September, 1792, on the day of the true autumnal equinox, when the sun entered Libra at 9h 18 30s in the morning, according to the meridian of Paris; that each year should begin at the midnight of the day on which the true autumnal equinox falls; and that the first year of the French republic had begun on the midnight of the 22nd of September, and terminated on the midnight between the 21st and 22nd of September, 1793. To produce a correspondence between the seasons and the civil year, it was decreed, that the fourth year of the republic should be the first sextile, or leap-year; that a sixth complementary day should be added to it, and that it should terminate the first Franciade; that the sextile or leap-year, which they called an olympic year, should take place every four years, and should mark the close of each Franciade; that the first, second, and third centurial years, namely, 100, 200, and 300 of the republic, should be common, and that the fourth centurial year, namely, 400, should be sextile; and that this should be the case every fourth century until the 40th, which should terminate with a common year. The year was divided into twelve months of thirty days each, with five additional days at the end, which were celebrated as festivals, and which obtained the absurd name of 'Sansculottides.' Instead of the months being divided into weeks, they consisted of three parts called Decades, of ten days each. It is however to be observed that the French republicans rarely adopted the decades in dating their letters, or in conversation, but used the number of the day of each month of their kalendar.

The republican kalendar was first used on the 26th of November, 1793, and was discontinued on the 31st of December, 1805, when the Gregorian was resumed.

Of the three parts into which the Romans divided their month, the *kalendæ*, or kalends, have been already explained. They were so called (à *calando* vel *vocando*), from the pontifex calling out to the people that it was new moon. The fifth day of the month was called *Nonæ*, the nones, and the 13th *Idus*, the ides, from the verb *iduare*, to divide; because the ides nearly divided the month. The nones, from *nonus*, the ninth, were so called because, counting inclusively, they were nine days from the ides. In March, May, July, and October, the nones fell on the 7th and the ides on the 15th of the month. The mode of fixing any particular day was by saying that it was so many days before the kalends, nones, or ides, next immediately following. Thus the 28th of April was the 4th day before the kalends of March; the 4th of March was the 4th day before the nones of March; and the 9th of March was the 7th day before the ides of March.

The Attic year consisted of twelve lunar months of 30 and 29 days alternately: an intercalary month of 29 or 30 days was inserted every two years, but as this was 7½ days too much, the intercalary month was sometimes omitted. The full Attic month consisted of 30 days, and was divided into three decades.

On the subject of the Greek Kalendar the reader may consult Ideler, *Handbuch der Mathematischen und Technischen Chronologie*.

(Adams's *Roman Antiquities*; Niebuhr, *On the Secular Cycle, Hist. of Rome*; Brady's *Clavis Calendaria*; Sir Harris Nicolas's *Chronology of History*; Hutton's *Philosophical and Mathematical Dictionary*, v. *Calendar*; Lindo's *Jewish Calendar*, 8vo. Lond. 1838.)

KALENDÆ. [KALENDAR.]

KALI, the name of the maritime plant from the ashes of which soda is obtained by lixiviation; and from the name of this plant, with the Arabic article *al*, is derived that of a class of substances possessing peculiar properties. [ALKALI.] Kali was also formerly employed to designate the alkali potash. [POTASSIUM.]

KALMUCKS. [CALMUCKS.]

KALSEEPEE. [ANTELOPE, vol. ii., p. 83.]

KALU'GA, a government of European Russia, lies between 53° 24′ and 55° 21′ N. lat., and 33° 20 and 37° E. long. It is bounded on the west and north-west by Smolensk, on the north-east by Moscow, on the east by Tula, and on the south by Orel. Authors differ extremely respecting its area. Schubert and Stein make the area about 8500 square miles; others make it considerably more, and Soimonoff gives it at 12,530, which Hassel however thinks too much, and prefers Schubert's estimate. According to the maps before us, we should say between 11,000 and 12,000; its length being 150 miles, and the mean breadth 75. The population is stated in 1836 at 1,309,500. The face of the country is one unvarying level; here and there broken by a low hill or the wooded bank of a river. In every direction there is one boundless flat, consisting partly of corn-fields, partly of meadows and commons, and it is but seldom that a little enclosure or a group of wood interrupts the uniformity of this uninviting scene. The soil varies considerably, but for the most part is clayey and sandy; in parts there is stiff clay: rich black mould is rare. Of the eighteen rivers, the principal are the Oka, a branch of the Volga, which is navigable by barks all the year; the Uva, which flows into the government of Tula, but is here navigable by barks only when the water is high; the Shisdra, which falls into the Oka to the west of Kaluga; the Ugra, which in some places forms the boundary towards Smolensk, and united with the Wora joins the Oka; the Ressata and the Tarusa, which flow into the Oka, and which, like the Shisdra and Ugra, are used only for floating rafts of timber. The Bolwa continues its course to Orel. According to Storch there are eleven, and according to Georgi five small lakes, one of which, in the circle of Serpeisk, is five wersts in length and one in breadth. There are marshes in some parts. The rivers freeze about the end of November and thaw by the end of March. The soil, being on the whole indifferent, requires much care and abundance of manure to make it yield four or five-fold; in general the produce is but two or three-fold; common barley, which produces from five to eight-fold, is often mixed with rye for bread. It is only in favourable years that the province produces enough for its own consumption. Hemp and flax are staple products, affording a surplus for exportation. Horticulture is carefully attended to: the inhabitants of the towns, as well as of the country, have their kitchen-gardens, which yield not only ordinary vegetables and potatoes, but abundance of hops and apples; finer kinds of fruit and vegetables are confined to the gardens of the rich. The forests, having been better managed than in some other governments, yield plenty of timber for all purposes. Game and fish are not plentiful. The breeding of cattle is merely subsidiary to agriculture, and the number of cattle is very small; the breeding of horses alone is attended to. The mineral products are bog-iron, stone for mill-stones, lime, gypsum, and turf; though no mines are worked, there are several great iron-forges, where, besides a little of their own bog-iron, ore from the other provinces is smelted.

The inhabitants are active, very temperate, and in easy circumstances. The country-people, especially the women, are much engaged in spinning and weaving; the men are chiefly mechanics and shopkeepers; and many go for work into other provinces. The brandy distilleries are very considerable. The manufactures of coarse woollens, linen, sailcloth, calico, silk, velvet, ribbons, leather, paper, glass, are important, considering the backward state of the country in general, and pretty large quantities are exported. Of the natural productions very little can be spared for exportation. The inhabitants are all Russians of the Greek church, under the bishop of Kaluga. The nobility are very numerous.

KALUGA, the capital of the government, is situated in 54° 30′ W. lat. and 36° 5′ E. long., on the river Oka, which is here 200 yards wide. It is about six miles in circumference, surrounded with a rampart converted into a public walk, has narrow crooked streets, and for the most part wooden houses. There are some good buildings, such as the bishop's palace, the residence of the governor, and the principal church; and there are 23 stone churches, an ecclesiastical seminary, a convent of nuns, a gymnasium, several schools, a theatre, a foundling hospital, &c. The manufactories are considerable, and the export trade, which extends even to Danzig, Königsberg, Brody, and Leipzig, is very active. The exports are canvas, paper, hats, leather, cottons, and woollens; likewise hemp-seed, hemp, flax, linseed, honey, and wax. Population (1836) 32,345.

KAMICHI. [PALAMEDEA; RALLIDÆ; MEGAPODIDÆ.]

KA'MPEN, or **CAMPEN**, a town of the Netherlands, in the province of Overyssel,* in 52° 37′ N. lat. and 5° 48′ E. long., situated on the left bank of the Yssel, near its mouth in the Zuyderzee, where it divides into several arms, and forms the island of Kampen. It was built in the year 1286; the antient fortifications are in a very dilapidated

* By mistake a reference has been made to this article from DRENTHE.

state. It has two churches, and a wooden bridge over the Yssel 723 feet long and 20 feet wide. The inhabitants amount to 8900: they manufacture great quantities of blankets, plush, and felt; and carry on a salmon-fishery on the Yssel. The trade, which formerly was considerable, has declined in consequence of the port being much choked up with sand. The environs can be laid under water.

KAMTCHATKA, a peninsula projecting from the north-eastern parts of Asia into the Pacific, in a direction nearly due south, lies between 51° and 63° N. lat., and between 155° and 165° E. long. Its length is above 800 miles, and its width varies between 30 and 120 miles. Its area is stated to be about 86,000 square miles, or somewhat less than that of Great Britain.

Its southern extremity, Cape Lopatka, is a low and narrow tongue of land (51° N. lat.), which however widens as it proceeds northward, and gradually rises into mountains. The country south of 53° 5′ is covered with hills and mountains, which are rocky and barren, and only in some inconsiderable valleys clothed with creeping cedar, and willow and stunted birch. At about 53° 5′ N. lat. is a mountain-knot, whence issue two ranges, one running due north, and the other north-east. These ranges enclose the vale of the river Kamtchatka. The western range, which first runs nearly due north, declines afterwards to north-north-east, and in that direction traverses the whole length of the peninsula, joining north of it the eastern branches of the Aldan Mountains. It does not appear to contain high summits, and its mean elevation probably does not rise above the line of trees, which in this country is about 3000 feet above the sea. But the range running east of the river Kamtchatka is distinguished by several high summits, which are of volcanic origin, and most of them still active. The highest, from south to north, are the Awatchanskaja, which rises to about 9500 feet; the Tolbatchinskaja, which attains 8346 feet; the Kliootchewskaja, the highest of all, rising to 15,825 feet; and the Shiwelutchkaja, whose highest summit is 10,591 feet above the sea-level. These volcanoes constitute the northern extremity of that extensive series which encloses the eastern coast of Asia, and traversing the islands of Japan and the Philippines, probably has a connection with the other series of volcanoes which traverse the Sunda and Molucca islands from east to west.

The mountains approach close to the eastern coast, which is composed of high rocks, rugged cliffs, and bold promontories, forming numerous inlets, the entrances to which are blocked up by reefs of rocks. The mountains are mostly covered with trees, which grow to a considerable height towards the south, but diminish in size as we advance northward. Numerous rocks are scattered in the sea at a distance of from one to three miles from the shores; some of them are only discernible by the breakers, while others tower up to a considerable height. The depth of the sea varies considerably and suddenly from 30 to 90 fathoms and more. Earthquakes are frequent, and sometimes very violent.

The western shores along the Sea of Okhotzk, or, as it is now frequently called, the Sea of Tarakai, north of the mountain-knot, are uniformly low and sandy to a distance of about 25 or 30 miles inland. They produce only willow, alder, and mountain-ash, with some scattered patches of stunted birch, and towards the north they are almost entirely overgrown with rein-deer moss. The sea is shallow to a considerable distance, and the soundings very regular. The small rivers which traverse this region have at their mouth not more than six feet at low water, with a considerable surf breaking on the sandy beach.

The best part of the peninsula is the vale of the Kamtchatka river, which towards its southern extremity is 40 miles across, but grows narrower as it proceeds northward. Its length is 180 miles. Its soil is deep and rich, composed of a black earth, and exhibits a considerable degree of fertility.

Among the rivers, only the Kamtchatka requires notice. It rises on the northern declivity of the mountain-knot, runs in general in a northern direction through the vale, but at Nishnei Kamtchatka, where it approaches its northern extremity, it turns east, and empties itself in a large but shallow bay, which is only eight feet deep at high water, and in which the breakers are very violent when an easterly wind blows. It flows about 300 miles, and is the only navigable river in the peninsula.

The climate of Kamtchatka, when compared with that of Europe under the same latitude, is very severe, but it is much milder than the eastern districts of Siberia. The frost sets in about the 10th of October, but up to the middle of December the thermometer commonly varies between 23° and 27° Fahr. During the following months it averages between 14° and 20°. In very severe frost it descends to −10° and −15°, and sometimes, though rarely, to −25°. On the sea-coast vegetation does not begin before the end of April, but in the vale of the Kamtchatka, which is sheltered on all sides by mountains, it begins at the end of March. Rain is frequent in summer, and in winter a great deal of snow falls.

Agriculture was introduced more than 80 years ago. In some places on the western coast, but more extensively in the vale of the Kamtchatka river, rye, barley, buck-wheat, potatoes, white cabbages, turnips, radishes, and cucumbers are grown, but these articles are only cultivated by the Russian settlers. The number of horses and cattle is on the increase. The natives formerly lived chiefly on the produce of the chace, by hunting bears, wild sheep, or argalis, wild rein-deer, ermines, black, red and stone foxes, wolves, sables, sea-otters, and fish otters; but since the number of these animals has considerably decreased, their time and industry are employed in fishing. In no part of the globe is fish more abundant. The natives scarcely know any other kind of food, and the bears and dogs, wolves and foxes, sea-otters and seals, water-fowl and birds of prey of various sorts, all feed upon fish. The most numerous kinds are herrings, salmon, and cod. Wild-fowl, especially geese and ducks, are very numerous and easily taken, as also sea-fowl, some species of which are eaten; but their eggs are of more importance to the inhabitants, of which whole boats-full are easily collected. Poultry is very scarce on account of the dogs, who devour the fowls wherever they find them. Whales are numerous, but they are not taken.

The forests, which cover the eastern chain, contain many fine timber-trees, which are little used, but might be employed in ship-building. These forests contain chiefly birch, larch, fir, and cedar pine (*pinus cembra*). The mineral wealth is little known: in some places there is iron-ore, and sulphur in immense beds is found in the vicinity of the volcanoes.

Two native tribes inhabit the peninsula, the Kamtchadales and the Koriakes, the former occupying the peninsula as far as 58° N. lat. The Koriakes wander through the country north of that of the Kamtchadales. It is not certain whether both tribes belong to the same race of men, but the difference in their features is not great. The Kamtchadales are short, but stout, and broad in the shoulders. Their head is large, their face flat and broad, their cheek-bones are prominent, their lips thin and their nose flattened. Their hair is black, hard and lank, their eyes sunk in the head, and their legs thin. They evidently belong to the Mongol race. The Koriakes are principally distinguished from them by the smallness of their head. Both nations differ in language and in mode of life. The Kamtchadales are huntsmen and fishermen, have fixed habitations, and use dogs to draw their sledges in winter. The Koriakes are a wandering tribe, subsisting on the produce of their numerous herds of rein-deer, of which the richer among them frequently possess several thousands, and their sledges are drawn by these animals. This last-mentioned tribe is scattered over a considerable part of the country between the Sea of Okhotzk and the Polar Sea. The whole population of the peninsula is stated not to exceed 5000 souls, but it seems that the wandering Koriakes are not included in this estimate. The number of Russian settlers and their descendants is said to amount to 1400, a few Cossacks included. The remainder are Kamtchadales.

The principal place is now Pétropaulovski, built on an extensive bay [AWATSKA BAY], with about 600 inhabitants. Nishnei Kamtchatka, on the river Kamtchatka, formerly the residence of the governor, hardly contains more than 100 inhabitants. Bolcheresk has a small harbour on the western coast, and about 200 inhabitants.

The commerce of Kamtchatka is inconsiderable. It exports only the furs of several animals which are taken by the natives, and imports several articles of food, especially flour, and of luxury, as whiskey, &c. But during the last century it acquired a greater importance by becoming the place whence the Russo-American Company sent vessels to the north-west coast of America for the purpose of procuring furs and skins of several wild animals, which pass from Kamtchatka to Okhotzk and thence to Kiachta. Since the

re-establishment of peace in Europe, and the restitution of the island of Java, the Dutch have begun to send every year one or two vessels to Petropaulovski with rice, flour, brandy, sugar, coffee, cloth, &c., and these goods pass hence into the eastern districts of Siberia.

Kamtchatka is a Russian province annexed to the government of Eastern Siberia, or that of Irkutsk.

(Cook's *Third Voyage;* Beechy's *Voyage;* Suer's *Account of an Expedition to the Northern Parts of Russia;* Krusenstern's *Voyage;* and Langsdorff's *Voyages and Travels in various Parts of the World.*)

KANDAHAR, or CANDAHAR. [AFGHANISTAN.]

KANGAROO, KANGOOROO, or KANGUROO. [MARSUPIALIA.]

KANT, IMMANUEL, the author of the 'Critical Philosophy,' and distinguished as well for the profundity of his views as for the extent and variety of his researches, was born April 22, 1724, at Königsberg in Prussia, where he died on the 12th of February, 1804. His native city, to which he was so attached that in a long life of nearly 80 years he never left it long or for a great distance, was the scene of Kant's literary activity. Educated at its gymnasium, he removed in 1748 to its university to attend the classes of philosophy, mathematics, and theology. Upon the completion of his academical studies, Kant passed many years in the capacity of tutor, according to his own confession with little satisfaction to himself, since the desire of acquiring knowledge interfered with the duty of imparting it. In 1755 he passed to the degree of M.A., when he commenced a series of private lectures on logic and metaphysics, physics, and mathematics, which he continued to give for fifteen years, until he was invited, in 1770, to fill the chair of the former science, which he held until 1794, when his declining strength compelled him to resign its arduous and laborious duties.

The skill and success with which Kant attacked, with his able and searching criticism, the specious but false pretensions of the existing philosophy, gained him the name of the 'smasher,' or the 'destroyer' (*der zermalmende*), from those who pretended that he was more skilful in destroying than in reconstructing a system. At the time when Kant first entered directly into the arena of philosophy, its possession was disputed by a superficial eclecticism and uncompromising dogmatism on the one hand, and on the other by a bold unlimited doubt which was cherished by the refined and consequential scepticism of Hume's writings. To put an end to this state of things, which was as dangerous to the truths of morality and religion as it was subversive of the legitimacy of knowledge, was the object of Kant's philosophical labours; and for this purpose he sought to expel both dogmatism and scepticism from the domain of philosophy.

Kant accordingly proceeded to an examination of man's cognitive faculty, in order to discover the laws and extents of its operation. This investigation he designated the criticism of the pure reason, and held that the reason, as a pure faculty, must criticise not only itself, but also, as the highest activity of the human intellect, the subordinate faculties of sense and understanding. Kant understood by *pure* whatever is independent of experience, as opposed to the empirical, which rests upon it. The pure, or whatever in knowledge expresses the universal and necessary is *à priori*, that is, antecedent to experience; whereas all that is contingent or only comparatively general is *à posteriori*. The first requisite in philosophy is a science which may establish a possibility, and determine the principles and extent of such knowledge. Now it cannot be derived from experience, which only shows an object to us such as it appears to be, without declaring that it must be such as it is. All attempts to derive the necessary from experience are unsuccessful, simply because they contradict the consciousness which recognises an essential difference between necessary and contingent. Experience serves only as a stimulus to awaken the faculties of pure cognition, so that afterwards, by reflection and abstraction (*absonderung*), we become specially conscious of them. As then we are undoubtedly in possession of such pure or *à priori* knowledge, of which it is impossible to place the origin in experience, it must have its root in the pure reason itself, which, on the other hand, cannot be the ground of the contingent and empirical; for the pure reason contains nothing but the formal or necessary principles of all knowledge, whereas the objects to which these principles refer are given to the mind from without. As an instance of these universal and necessary principles, Kant adduces the law of causation, the speculations of Hume upon which afforded the occasion of his philosophical investigations. He observes that the notion of a cause so manifestly implies the necessity of its being connected with some effect, and enforces so strongly the universality of this law, that it is totally inconsistent with the derivation of it from the repeated association of an effect with an antecedent. The next point which Kant notices in the 'Introduction to Critic of the Pure Reason,' as of great importance for the right appreciation of his philosophical system, is the distinction between analytical and synthetical judgments. The former are those in which the predicate is connected with the subject by identity; the latter are devoid of all identity of the subject and predicate. Analytical judgments may be also termed explanatory, the synthetical extending (*erweiterungsurtheile*) judgments; since in the former the predicate adds nothing to the notion of the subject, and only resolves the notion which forms the subject into its constituent and subordinate notions, which however involved are really contained in it, whereas in the latter a new element is added by the predicate to those already contained in the subject, which was not previously understood in it, and therefore would not result from it by any analysis. For instance, the proposition that all bodies are extended is analytical; but the assertion that all bodies are heavy is synthetical. All the conclusions of experience are synthetical. Experience proves the possibility of the synthesis of the predicate 'heavy,' with the subject 'body;' for these two notions, although neither is contained in the other, are nevertheless parts of a whole, or of experience, which is itself a synthetical combination of its intuitions (*anschauungen*), although they only belong to each other contingently.

This contingent bond of union however is wholly wanting in synthetic judgments *à priori*. For instance, in the position, 'whatever happens has a cause,' the notion of a cause is not contained in the subject 'whatever happens,' and it indicates something very different from it. How then, and by what means, are we enabled to say of 'whatever happens' something absolutely different from it, and to recognise 'cause,' although not contained in it, as necessarily belonging to it? What is that unknown principle (=X) on which the understanding relies, when of the subject A it finds a foreign predicate B, and believes itself justified in asserting their necessary connexion? It cannot be experience, since in the above proposition the conception of a cause is attached to the subject, not merely generally, but universally and necessarily. Now all speculative *à priori* knowledge ultimately rests upon such synthetic or extending judgments; for though the analytical are highly important and requisite for science, still their importance is mainly derived from their being indispensable to a wide and legitimate synthesis, whereby alone a new acquisition in science can be made. The proper problem therefore of the pure reason is contained in the question—how are synthetic judgments *à priori* possible?

With a view to resolve this problem of the pure reason Kant begins with an exposition of the transcendental elements of knowledge (*transcendental elementarlehre*). By transcendental he understood original or primary, or whatever is determined *à priori* in reference not only to human cognition but also to man's collective activity, and which consequently is the basis of the empirical, or that which is determined *à posteriori*. In short, all pure knowledge makes up the transcendental philosophy, and on it rest the authority and possibility of cognition. The *elementarlehre* is divided into the transcendental æsthetic and the trancendental logic. In the former Kant investigates the *à priori* elements of the lowest cognitive faculty—sensation; in the latter, those of the understanding and of the reason. In the æsthetic he shows that the sensuous faculty receives the matter of its intuitions and sensations from without by means of certain affections or excitements of the sense, whereas the forms according to or by means of which this matter is shaped into representations or conceptions of determinate objects are given originally and by itself. These forms are the pure intuitions of space and time, because in them nothing else is intuitively viewed than the unity of that which is multiple either in succession or in co-existence. On this account he calls time and space forms of intuition, and designates the objects which we so intuitively view by the name of phenomena. Of the ground of these phenomena, or, as Kant termed it, the thing in and by

itself, it is left doubtful, and undetermined whether it is anything actual or not, notwithstanding that Kant ascribes to phenomena themselves a certain objectivity or reality, on the ground that from their constancy and regularity they cannot be a mere semblance or illusion of the senses. On this account his theory has been called a transcendental idealism, as being in nowise inconsistent with that system of empirical realism which by our conduct in life we practically maintain.

Transcendental logic is divided into analytic and dialectic, of which the former is the critic, or investigation of the understanding, as the faculty of notions; the latter, of the reason, as the faculty of ideas. In the analytic we are taught that it is only when objects have been conceived by the understanding agreeably to its laws, that they can become an object of knowledge. The operations of the understanding are confined to analysis and synthesis, where however every analysis presupposes a synthesis. A combination of the multiple into unity constitutes a notion (*begriff*), and the understanding is therefore the faculty of notions. The law of the forms of these notions, irrespective of their contents, is investigated by logic in general, whereas the investigation of these notions in reference to their contents is the proper office of transcendental logic. Notions are either pure or empirical: the former indicating merely the nature and the manner of their combination; the latter, the multiple matter presented by experience. Both are equally necessary to knowledge, for the pure notion is an empty thing apart from the representations, and the latter without the former are blind (*Kritik d. rein. Vern*, p. 55). As sensation only receives matter upon the affection of the senses, it is a mere receptivity, whereas the understanding, which subsumes the given multiple into unity, is a spontaneity. The consciousness of the individual in this multiplicity is effected by the imagination, which combines them into a whole; whereas the unity, by which the multiplicity, as sensuously perceived, is recognised as an object, is a work of the understanding. Now this unity constitutes the form of the notion, which therefore is the peculiar creation of the understanding. As these forms are different, a complete enumeration of them conformable to some stable principle is necessary in order to a discovery of the laws of knowledge by the understanding. Now all the primary modes of the operations of the understanding, whereby objective unity is imparted to the perceived matter, may be reduced to one of these four: quantity, quality, relation, and modality. These, with their subordinates, Kant denominates categories after Aristotle, as determining in and by themselves what in general and antecedently (*à priori*) may be predicated of objects.

The three categories of quantity are unity, multitude, and totality; those of quality, reality, negation, and limitation. Those of relation are double and are paired together, as substance and accident, cause and effect, action and re-action. Lastly, the subordinates of modality are possibility, existence, and necessity.

The process by which these 12 categories, or pure notions of the understanding, are combined with space and time, the pure intuitions of sensation, and thereby presented to knowledge in their possible application to the objects of sense, Kant calls schematism (σχηματισμός). For instance, the notion of substance is said to be schematised, when it is not conceived of absolutely as a self-subsisting thing, but as one which persists in time, and therefore as a constant and persisting substrate of certain variable qualities or determinations. Notions thus rendered sensible are called schematised, in opposition to the pure categories. In this process the imagination co-operates with the understanding, and its action is original and necessary, since its activity is inseparably bound up with the primary images of space and time. Out of this schematism of notions and the judgments which arise from their combination, the grand principles which regulate the operations of the understanding result. These judgments are either analytical or synthetical. The grand principle of the former in which identity affords the connexion between the subject and the predicate, is the principle of contradiction. The mere absence however of contradiction is not sufficient to legitimate the object matter of any proposition, since there may easily be a synthesis of notions which is not grounded in objects, notwithstanding that it is not inconsistent to conceive. In synthetic judgments, on the other hand, we go beyond the notion which forms the subject, and we ascribe to it a predicate, the connexion of which with the subject does not appear immediately from the judgment itself. The possibility of this synthesis implies a medium on which it may rest, and this is the unity of the synthesis in truth *à priori*. The following is the ultimate principle of synthetic judgments:—All objects are subject to the necessary conditions of the synthetic unity of the multiple objects of intuition in a possible experience. As this unity is established according to the table of categories, there must be as many pure synthetic principles as categories, and the different characters of their application must depend upon the different characters of the latter. These are either mathematical, and relate to the possibility of intuition, or dynamical, and relate to the existence of phenomena. Accordingly the principles of the understanding are, relatively to their use, either mathematical or dynamical. The former are unconditionally necessary, since the possibility of intuition depends upon them; the latter only conditionally necessary, for so far as concerns the existence of phenomena, which for a possible experience is contingent, they imply the condition of empirical thought, notwithstanding that in their application to it they invariably maintain their *à priori* necessity.

By these principles of the pure understanding the possibility of mathematics and of a pure science of nature may be fully and satisfactorily explained. The matter of mathematics is the multiple object of space and time, which are given as the forms of *à priori* intuition. This multiple matter is elaborated by the understanding according to the rules of logic, and as the phenomena must be in accordance with the conditions of space and time, or the forms under which they are intuitively viewed, *i.e.* the relations of space and time must be discoverable in phenomena themselves. The possibility of mathematics therefore rests simply on this, that objects cannot be conceived of except in space and time, from which however it follows at the same time that mathematics do not admit of application beyond the sphere of sensible phenomena. The pure science of nature likewise cannot have any other object than the system of *à priori* laws. It is only under the forms of sensation that individual objects can be intuitively viewed, and their mutual connexion cannot be thought of otherwise than under the forms of the understanding. If then the system of phenomena are to be an object of knowledge, they must correspond to the pure synthetical principles of the understanding, and it is only by these *à priori* laws that a science of nature is possible. But the principles of this pure science of nature do not admit of being applied beyond the domain of experience.

The important result of the transcendental logic is that the operations of the understanding are only legitimate in reference to experience, and that consequently the use of the understanding is empirical, and not transcendental. It would be the latter if it could apply itself to objects not as phenomena merely, but as things absolutely. But such a use of the understanding is obviously invalid, since the objective matter of a notion, or *begriff*, is given by intuition alone, and it is only by means of the empirical that the pure intuition itself comes to the object of which it is the form. These forms are simply representations of the object according as it conceived under them. To the *subsumtion* of an object under a category, a schema, 'time,' is indispensable, and, apart from all sensation, this schema itself does not subsist; and the subsumtion, or arrangement of an object under the categories, is impossible. There may undoubtedly be a logical use of the categories beyond the domain of experience, but this, notwithstanding that it has its ground in the nature of human reason, is either altogether idle, or else involved in contradictions (antinomie) which the transcendental dialectic investigates.

But besides phenomena there are other objects presented to the understanding, by a non-sensuous intuition of which consequently it can take cognisance. These Kant calls *noumena* (νοόμενα). The distinction between noumena and phenomena does not consist merely in a logical difference of the greater or less distinctness of their cognoscibility, but in a specific difference of the objects themselves. A noumenon is not the thing in and by itself, for the thing in and by itself becomes evanescent for knowledge when conceived of independently of all sensuous forms. Nevertheless as experience invariably refers back to something independent of and prior to sensation, the noumenon may be considered as an object which is presented to the under-

standing by an unsensuous intuition. The general possibility of such a species of intuition is undeniable, notwithstanding that its objects are impossible to be known by man, whose knowledge is dependent on sensation. In a positive sense Kant applies the term of *noumenon* to the notion of God, and generally to all supra-sensible objects, which may be conceived of, but nevertheless cannot be an object of perception.

The criticism of the transcendental dialectic gives this result—that the ideas of the reason, as pure speculative ideas, are nothing more than simple conceptions, for which no corresponding object can be scientifically shown to exist. Accordingly neither the existence of God, nor the immortality of the soul, nor the freedom of the will, can be demonstratively established. Nevertheless the reason is not merely a theoretical, but also a practical faculty, *i.e.* it gives the law of human conduct and action. Now these laws present themselves with such unconditional necessity (the *categorical imperative*), that no rational man endued with self-esteem can refuse obedience to them; and, on the other hand, without the freedom of the will these laws could not be obeyed; and without God and the soul's immortality there would be no final cause or motive for human conduct, which must be placed in a state of felicity, agreeable to morality, provided by and to be obtained through God, in another and a better life. Consequently every man who is conscious of his moral destination holds these practical ideas to be both true and objectively legitimate, notwithstanding that he is compelled or required to admit them merely by a subjective ground—the testimony of his own consciousness, and of the moral wants resulting from its dictates. This Kant calls the postulate of the practical reason. The acceptance of this postulate as true and legitimate does not constitute a scientific certainty, or knowledge properly, which indeed does not exist for the supra-sensible; it is merely a belief. This faith, or belief, however, is thus distinguished from every other, that it is a moral or practical faith, and consequently possesses for the believer all the certainty requisite for the guidance and conduct of life, and consequently it enjoys a subjective certainty and authority. This faith is the proper foundation of religion, which is nothing else than a conscientious observance of all duties as divine commands, since God, as the moral law-giver, cannot be worthily honoured otherwise than by obedience to the laws of morality.

Lastly, the critic of the faculty of the judgment (*urtheilskraft*) investigates its operations from an æsthetical or teleological point of view. The totality of objects which constitute nature are in harmony with man's faculty of knowledge. Every object may be considered æsthetically or teleologically; it possesses as it were two natures, one æsthetical and one teleological. The former is the point of view under which it appears to man; the latter consists in its formal or material concordance with the general harmony of things. Now the agreement which we perceive to subsist between a particular object and such an end does not belong to and is not in the object itself. It is, on the contrary, purely subjective; it belongs to the mind that discovers it, and is dependent upon the mental constitution. In the same manner the judgment is of two kinds. It may either refer to man's mode of conceiving and apprehending objects, and to the degree of pleasure with which the perceptions of them are accompanied; or it may consider the harmonious co-ordination of all things and their subordination to a general end, *i.e.* the objective harmony of nature. The beautiful, the agreeable, and the useful are the forms of our æsthetical judgments, and the perceptions of them are accompanied with pleasure. Nevertheless they affect us differently, and the sensation of pleasure which the beautiful occasions is of all the most complete. The beautiful is the most noble and most elevated of all the forms of æsthetical judgments. It exists in us antecedently to and independently of all experience. It is inherent in us, and forms a constituent element of our proper nature. Our judgments of objects are as necessarily respective of the beautiful as the practical reason is of the just and the good.

The knowledge of nature is only possible on these two conditions: that there are certain relations subsisting between the system of nature and the human mind; and that harmony reigns throughout the system of natural objects, and the necessary subordination of each separately to some general end. Considered in this light, organical being is the most excellent production of nature. The examination of any organical body displays an admirable subordination of the parts to the whole, and the whole itself is in exquisite harmony with each of its parts. But at the same time the whole itself is but a mean to other ends, a part in a greater totality. Consequently the most exalted form of the teleological judgment is that which considers the whole system of nature as one vast organical structure Thus considered, the synthetic activity of the judgment exercises itself in two ways, either æsthetically or teleologically. In the former case it refers all its decisions to the idea of the beautiful; in the latter, it subordinates all things to a final cause.

No complete edition of the works of Kant has yet appeared. The most important in a philosophical sense are the 'Kritik der reinen Vernunft,' 7 ausg., Leipzig, 1828; 'Kritik d. praktischen Vernunft,' 6 ausg., Leipz., 1827; and the 'Kritik d. Urtheilskraft,' 3 ausg., Berl., 1827. For a list of his other works see Tennemann's *Manual of the History of Philosophy* (English translation), p. 409, Oxford, 1832.

KANTEMIR, PRINCE ANTIOCHUS DMITRIJVITCH, descended from a family of Turkish extraction, was born at Constantinople, September 10th, 1708. He received his first education at Kharkov, whence he proceeded to the academy at Moscow, where he made such proficiency in his studies that when scarcely ten years old he composed and recited a discourse in Greek on St. Demetrius. In 1722 he accompanied his father, who was hospodar of Moldavia, in the campaign against Persia, after which (1725) he prosecuted his studies in the Academy of Sciences at St. Petersburg, directing his attention to that language whose literature he subsequently enriched. It was not long before his talents recommended him to the notice of the empress Anne; and in 1731 he was despatched to the British court in quality of resident, but in the following year was promoted to be ambassador extraordinary and plenipotentiary, in which capacity he was sent in 1738 to the court of France. The empress Elizabeth confirmed all the dignities that had been bestowed upon him by her predecessor. He died at Paris, March 1, 1774, of dropsy in the chest, and his body was conveyed to Moscow for interment in the Greek cloister.

Equally amiable and intelligent, his aim as a writer was to inform and correct, as is sufficiently attested by his Satires, which if now somewhat antiquated in regard to versification and style, are justly esteemed for their originality, truth, and force of colouring, and for the philosophical mind which they display. Both Zhukovsky and Batiuskkov have eulogized the merits of Kantemir as a writer and a man; the first in an analytical essay on his Satires, the other in a very interesting sketch entitled 'An Evening with Kantemir,' a long extract from which may be found in the second volume of the 'Foreign Review.' His other works were chiefly translations, viz. ten of the 'Epistles of Horace,' Fontenelle's 'Plurality of Worlds,' Epictetus, Cornelius Nepos, Montesquieu's 'Persian Letters,' &c.; but except the two first none of the others have been published.

KAOLIN, the Chinese name for porcelain clay. It occurs massive and disseminated in disintegrating granite rocks, and is generally supposed to be derived from the decomposition of the felspar which they contain. Its colour is either white, yellowish, or reddish-white. Fracture fine earthy; soft, dull, and opaque; adheres to the tongue; specific gravity 2·216; infusible.

Kaolin is found in China, France, Saxony, &c.; and in England a large tract of this substance occurs near St. Austle in Cornwall, on the south side of the granite range. It contains crystals of felspar, quartz, and mica. From this source the porcelain manufactory of Worcester is supplied.

Analysis by Berthier:—

	Limoges.	Schneiberg.
Silica	46·8	43·6
Alumina	37·3	37·7
Potash	2·5	0·0
Peroxide of iron	0·0	1·5
Water	13·0	12·6
	99·6	95·4

Rose analyzed a Kaolin which was composed of 56 silica and 44 alumina.

KARABAGH. [GEORGIA.]

KARAMSIN, NIKOLAI MIKHAELOVITCH, one

of the most eminent writers that Russia has yet produced, and the one to whom its literature is mainly indebted for the popularity it has acquired, and the rapid progress it has made since the commencement of the present century, was born in the government of Simbirsk, December 1st, 1765. Having completed his education at Moscow, he served with a commission in the Guards, and in 1789-91 visited Germany, Switzerland, Italy, France, and England, which tour he has described in his 'Letters of a Travelling Russian,' of which there exists an English translation, or rather a copy of the German one. On his return to Moscow he devoted himself entirely to literature, one of his first undertakings being the 'Moscow Journal,' which was succeeded by 'Aglaia,' the 'Pantheon,' and the 'Væstnik Europæ,' or European Intelligencer (1802). Besides various narratives and other papers, both original and translated, these publications contained many articles of criticism by him, and were well calculated to promote a love of reading among all classes of his countrymen. These however were comparatively insignificant productions, chiefly remarkable for careful polish and correctness of style. The great work to which he entirely devoted himself from 1803 to the very time of his death, is his 'History of the Russian Empire,' which however he did not live to complete beyond the eleventh volume. This laborious task, which may in more senses than one be said to be the very first historical work in Russian literature, is a monument both of diligence and genius. The labour of collecting and arranging the vast mass of materials requisite for it must have been immense, yet never was historian more liberally repaid by the enthusiasm with which his work was instantly received. Its sale and popularity were unprecedented; it was to be seen everywhere, in the hut of the peasant and the palace of the noble; and no wonder, for in spite of all the imperfections that the utmost rigour of criticism has been able to allege against it, it is most captivating and interesting to all who are capable of perusing it in the original, whether foreigners or natives. It has been translated both into German and French, but with what degree of fidelity or ability we are unable to state. The first edition, comprising the first eight volumes (1816), produced him the sum of 100,000 rubles, also the title of counsellor of state, and the order of St. Anne, which were bestowed on him by the emperor Alexander.

After his death the twelfth volume, then nearly prepared in manuscript (bringing the history down to 1611), was edited by M. Bludov, minister of the interior. Since then a continuation of the work has been undertaken. Karamsin died in the Tauridan palace, where apartments had been assigned him, June 3rd, 1826. The emperor munificently bestowed on his widow and family a yearly pension of 50,000 rubles.

His merits and celebrity as an historian and a prose writer have so completely eclipsed his reputation as a poet, that he is scarcely ever considered in that character, notwithstanding that his poetical pieces are not without their value. In his private character he was amiable, noble, liberal, and disinterested; and an interesting sketch of his domestic habits has been given by Bulgarin in a piece entitled 'My First Acquaintance with Karamzin,' an English translation of which has appeared in the 'Old Monthly Magazine.'

KARPHOLITE, a mineral which occurs in minute crystals and in stellated silky fibres. Scratches fluor spar, and is scratched by felspar; colour wax or straw yellow. Lustre of the crystals vitreous; of the fibres silky. Specific gravity 2·93.

Before the blowpipe on charcoal fuses into a dark glass, which becomes darker in the interior flame. With borax it melts into a transparent glass, which in the exterior flame has a manganese colour, and in the interior becomes greenish.

Analysis by

	Stromeyer.	Steinman
Silica	36·154	37·53
Alumina	28·669	26·48
Oxide of manganese	19·160	17·09
Oxide of iron	2·290	5·64
Lime	0·271	..
Fluoric acid	1·470	..
Water	10·780	11·36
	98·794	98·10

KARPHOSIDERITE, hydrous phosphate of iron, occurs in reniform masses. Structure granular, compact; fracture uneven; hardness 4·0 to 4·5; specific gravity 2·5; colour pale and bright straw yellow, and streak the same; lustre resinous; feels greasy; opaque: when heated in a tube gives off water, and a vapour which reddens litmus paper.

Before the blowpipe, *per se*, it becomes black, and melts into a globule which obeys the magnet; with salt of phosphorus, it forms a black scoria. It is found at Labrador.

KARTLI. [GEORGIA.]

KASAN. [CASAN.]

KATMANDU. [NEPAUL.]

KATTI. [HINDUSTAN, p. 221.]

KEATS, JOHN, was born in Moorfields, London, in the year 1796. He received a classical education at Enfield, under Mr. Clarke, and was afterwards apprenticed to a surgeon. Mr. Clarke introduced him to Mr. Leigh Hunt, who is said to have introduced him to public notice. In 1817 he published a volume containing his juvenile poems, and shortly afterwards his long poem 'Endymion,' which called forth a violent attack from the 'Quarterly Review.' Keats was of a remarkably sensitive disposition: his constitution was weak, and greatly impaired by the attentions which he bestowed on a dying brother, and his death has been attributed to the shock which he received from the article in the 'Quarterly.' Lord Byron seems to have believed this, and in his 'Don Juan' alludes to the circumstance, concluding with the reflection:—

> 'Tis very strange, the mind, that fiery particle,
> Should let itself be snuffed out by an article.'

To recover his health, Keats travelled to Rome, where he died on the 24th of February, 1821, having previously published a third volume of poems, containing 'Lamia,' 'Isabella,' 'The Eve of St. Agnes,' and 'Hyperion.'

The poetry of Keats is of an exceedingly rich and luxuriant character, and his writings so crowded with images, that it at last becomes almost fatiguing to apprehend them. It seems as if his imagination were of that volatile nature which must start off to every idea associated with his subject, and embody it as a part of the whole. Hence the reader must put himself in the place of the poet, and allow his own imagination to fly from thought to thought, or the work will seem but a compound of wild unconnected pictures. The article in the 'Quarterly' observed, that he introduced many images merely for the sake of rhyme, and this remark is not wholly unjust. He did not however, like many poets, merely write some common-place epithet or sentence for the sake of rhyme; but it seems as if his imagination was so fertile, that a chiming word brought with it a new image suitable to his purpose. Some have thought that time would have matured his judgment and have improved him, but this is doubtful; the wild transition from thought to thought is the essence of his poetry, and not a mere accident, and a cool inquiry into the aptness or connection of his images would rather have injured him as a poet than have been of advantage.

To elucidate the above remarks, a passage is selected by way of example:—

> 'Oh! magic sleep—oh! comfortable bird,
> That broodest o'er the troubled sea of the mind
> Till it is hush'd and smooth'd! Oh! unconfined
> Restraint! Imprison'd liberty! Great key
> To golden palaces, strange minstrelsy,
> Fountains grotesque, new trees, bespangled caves,
> Echoing grottoes, full of trembling waves
> And moonlight; aye, to all the mazy world
> Of silvery enchantment!'——

The poet begins by representing sleep under the figure of the bird brooding over the mind, and, still having the idea of comfort associated with that of sleep, does not hesitate to give the bird the dubious epithet 'comfortable.' Then suddenly dropping sleep as an active power (the *brooding* bird), he takes it as a state, and finds the paradoxical expressions 'unconfined restraint,' 'imprison'd liberty.' The word liberty gives rise to the question 'liberty for what?' The answer is, 'to roam in the world of dreams;' and the fertile imagination of Keats at once converts sleep into a key which is to open the gate leading to that world. The above is a fair specimen of the richness and wild luxuriance of Keats's poetry, and the tendency of his mind to dart in all directions for images.

The article in the 'Quarterly' dwelt too much on the

form of the poetry, and did not regard the beauty of many of the thoughts, nor the great power displayed of giving a being and a presence to the wildest imaginations. Hence most of the observations were just, but the poet was only regarded on his most unfavourable side.

Again Keats laid himself greatly open to ridicule; he evidently lived in a world created by his own imagination; the words that he used were to him symbols of beautiful thoughts, but he forgot that the sound of certain expressions is ridiculous in society, however appropriate the conception belonging to such words may be. Thus he says seriously, 'Dolphins *bob* their noses through the brine,' the justness of the image making him forget that an ordinary reader would necessarily smile at the word 'bob;' and this is one of numerous instances. Hence when the conventional rules of language are taken as the standard by which to judge him, he is always open to attack.

In the sublime Keats is not so happy as in the wildly beautiful. In the fragment 'Hyperion,' where we miss the exuberance, we also miss the brilliant fancies of the 'Endymion,' while at the same time the attempt at sublimity is rather an incumbrance.

In conclusion, it may perhaps be said, the works of Keats are adapted only to those who are really of a poetical temperament, and who have an imagination capable of following if not of creating. To the readers who look for poetry as a pleasant form of some clear and connected subject, who prefer authors that rather anticipate their imagination than call it into violent action, Keats's poems will be of small value.

KEEPER, LORD. [LORD KEEPER.]

KEIGHLEY. [YORKSHIRE.]

KELP, the ash remaining after the incineration of seaweed, which is burnt for the purpose of obtaining carbonate of soda from it. It contains but little of the alkaline salt, but a large quantity of common salt, some salts of potash, and probably iodide of sodium. It was formerly much used in glass and soap making, and from the residue, after separating the carbonate of soda, large quantities of iodine are now obtained. [SODIUM.]

While a heavy duty was imposed upon barilla imported from foreign countries, a considerable quantity of kelp was made on the coasts of Ireland and the western coasts and islands of Scotland, the inferior quality of the native production being more than compensated by its exemption from duty. The business of kelp-burning was long before carried on in Ireland, and about a century from the present time the manufacture was begun in Scotland, where, in consequence, the land in certain localities by the sea-shore became greatly advanced in value, very large annual revenues being derived from estates which had previously been wholly unproductive. The adoption of a more liberal line of commercial policy in this country, and the advancement of chemical science, have caused the manufacture of kelp to be given up, and the rocks and shores on which it was produced have again become valueless.

From the impurity of the alkali, and the large proportion of foreign matters combined with it, kelp could be used only in processes of a coarse description: its principal employments were in the manufacture of soap and common bottle-glass, for which purposes a better and cheaper alkali, made from common salt (chloride of sodium), is now used, and the only purposes for which sea-wrack is at present collected are the manuring of land, and, in hard seasons, the supply of winter food for cattle. Kelp having never been subject to the payment of duty, no record was ever taken of the quantity produced, which was at one time estimated to be more than 25,000 tons annually.

KELSO. [ROXBURGHSHIRE.]

KEMBLE, JOHN PHILIP, was born on the 1st of February, 1757, at Prescot, in Lancashire. His father, Mr. Roger Kemble, was manager of a provincial company performing in Staffordshire, Warwickshire, Gloucestershire, &c. His mother's maiden name was Ward. John Kemble was not intended by his father for the stage, although during his childhood he was occasionally called upon to represent parts suitable to his age, the first upon record being that of the little Duke of York in Havard's tragedy of 'Charles I.,' his sister Sarah (afterwards Mrs. Siddons) acting the Princess Elizabeth. This was on the 12th of February, 1767, Mr. Kemble being then just ten years old. He received the rudiments of education in a preparatory school at Worcester, from whence he was sent to the Roman Catholic seminary of Sedgeley Park, in Staffordshire, and afterwards to the English college at Douay, in France, where he made great progress. At the age of nineteen he returned to England, and following immediately the natural bent of his inclination towards the stage, made his appearance in the character of Theodosius in the tragedy of that name, at Wolverhampton, January 8th, 1776. Two years afterwards he was a regular member of the York Company. On Tuesday, 30th of September, 1783, Mr. Kemble made his first appearance in London at the Theatre Royal, Drury-lane, in the character of Hamlet. In 1790 he became manager of that theatre. In 1803 he purchased for 24,000*l.* a sixth share in Covent-garden Theatre from Mr. Lewis, and became manager of that establishment, having previously made a tour through France and Spain. In 1808 Covent-garden was destroyed by fire, and on the 31st of December, at the ceremony of laying the foundation-stone of the new theatre, Mr. John Kemble's bond for 10,000*l.* was munificently cancelled by his Grace the late Duke of Northumberland. On the opening of the new theatre in 1809, under Mr. Kemble's management, an advance in the prices of admission to the pit and boxes gave rise to the well-known O. P. riots, during which the great tragedian was personally and grossly insulted whenever he appeared upon the stage. A compromise was at length made between the manager and the public, and Mr. Kemble continued to direct the entertainments at Covent-garden in the best spirit of enterprise and liberality, reviving the plays of Shakspeare with great splendour and as much propriety as was at that time perhaps within his power. On the 23rd of June, 1817, he took his leave of the London audience, having previously bid farewell to that of Edinburgh (March 29th), and on the 27th of June a public dinner was given to him at the Freemasons' Tavern, when Lord Holland was in the chair. Mr. Kemble, who had long suffered severely from asthma, soon afterwards retired to the south of France for the benefit of his health, and, after a short visit to England on the death of his partner, the elder Mr. Harris, he finally took up his residence at Lausanne, in Switzerland, where he expired February 26th 1823, aged 66. Mr. Kemble's talents, both as an actor and a manager, were of a very high order: his fine taste and classical acquirements were perceptible in every effort, and in his personation of the loftier heroes of the drama he has never been equalled. His Brutus, Coriolanus, Cato, King John, Wolsey, and Macbeth, are still fresh in the remembrance of thousands, and, while the recollection of them remains, his successors to the tragic throne must, in those particular characters, suffer by comparison. His King Lear also, as a whole, may be mentioned amongst his almost unapproachable impersonations. His very feebleness in his latter years added to the terrible truth of the picture. In society Mr. Kemble was ever the accomplished gentleman as well as the convivial companion, and to the last enjoyed the respect and regard of the noblest and wisest in the land. The theatrical profession owes him a deep debt of gratitude for the respectability to which he raised it by his example. He furthered the good work which Garrick had begun, next to whom he must always rank amongst the worthies of the drama. Mr. Kemble's life has been written by his friend Mr. Boaden, in two vols. 8vo.

KEMPIS, THOMAS A, born about 1380, at Kempen, near Cologne, studied at Deventer, in a religious congregation or community called 'the brothers of common life,' and afterwards became a regular canon of the monastery of Mount St. Agnes, of which his brother John of Kempis, was prior. He there applied himself to transcribing the Bible, the Missale, several works of St. Bernard, and other religious books. He was an excellent copyist, and very fond of that kind of occupation. He was employed fifteen years in transcribing a Bible in 4 vols. fol., which he completed in 1439. He afterwards began a collection of pious and ascetic treatises, among which were the four books 'De Imitatione Christi,' which have been erroneously ascribed to him as his own composition, but which he merely transcribed from older manuscripts. The question of the authorship of the work 'De Imitatione Christi,' which is a book of real merit, displaying a deep knowledge of the human heart, and of the world, as well as of the inward spirit of Christianity, has been often debated. It is however most generally attributed to John Gerson, chancellor of the university of Paris, and a great theologian, who died in 1429. (Barbier, *Dissertation sur les Traductions Françaises de l'Imitation de J C.*, Paris, 1812.)

Thómas à Kempis composed some ascetic treatises, such as 'Dialogus Novitiorum de Contemptu Mundi,' &c., but they are very inferior to the book 'De Imitatione J. C.' He wrote also a Chronicle of his Monastery, and other compilations. He died in 1471, at ninety years of age.

KEMPTEN (the antient Campodúnum), a town of Bavaria, in the old duchy of Suabia, and the modern circle of the Upper Danube, on the bank of the Iller, in 47° 44′ 40″ N. lat. and 10° 18′ 45″ E. long. It is built in the old-fashioned style, and consists of two parts, that called the *Stifts-stadt*, or St. Hildegard, which is situated on a mountain, and is an open town, and the antient free imperial city, which is in the valley. It has a castle, two churches, a gymnasium, with a library and collection of works of art, an hospital, and an orphan asylum. There are manufactures of cotton and linen, and considerable trade in furs, wool, salt, linen, Italian and Dutch goods. The antient abbey was in the Stifts-stadt. The Prince Abbot was among the estates of the Empire, high marshal to the empress, was immediately under the pope, and possessed, with the district of Buchenberg, 326 square miles, 8 towns, 145 villages, with 43,000 inhabitants, and a revenue of 300,000 florins. The abbey and the town were assigned to Bavaria in 1802. The population of Kempten is about 7000.

KENDAL. [WESTMORLAND.]

KENEH. [EGYPT.]

KENILWORTH. [WARWICKSHIRE.]

KENNEBECK. [MAINE.]

KENNETT, WHITE, born 1660, died 1728, distinguished as a divine, antiquarian writer, and prelate of the Church of England; a man, as his biographer says, 'of incredible diligence and application, not only in his youth, but to the very last, the whole disposal of himself being to perpetual industry and service, his chiefest recreation being variety of employment.' His published works are, according to his biographer's catalogue, in number fifty-seven, including several single sermons and small tracts; but perhaps not a less striking proof of the indefatigable industry ascribed to him is to be seen in his manuscript collections, mostly in his own hand, now in the Lansdowne department of the British Museum Library of Manuscripts, where from No. 935 to 1042 are all his, and most of them containing matter not incorporated in any of his printed works.

His course in life was this: he was the son of a Kentish clergyman, educated at Westminster and Oxford, had the living of Amersden early bestowed upon him, with a prebend in the church of Peterborough, but returned to Oxford, where he became vice-principal of Edmund Hall, the college to which Hearne belonged; resigned Amersden; settled in London as minister of St. Botolph's, Aldgate; was a popular preacher; made archdeacon of Huntingdon, dean of Peterborough, and finally, in 1718, bishop of Peterborough.

His principal published works are:—1. 'Parochial Antiquities, attempted in the History of Ambrosden, Burcester, and other adjacent places in the counties of Oxford and Bucks,' 4to., 1695. This has been reprinted. In this work his very useful glossary is to be found. 2. 'The Case of Impropriations, &c., with an Appendix of Records and Memorials,' 1704. 3. 'A Register and Chronicle, Ecclesiastical and Civil,' in two volumes folio, 1728; relating to the events of a few years of the reign of King Charles II. He also published a corrected edition of 'The History of Gavelkind,' by William Somner, to which he prefixed a life of that eminent Saxonist. Most of his other works were either sermons or controversial tracts, many of the latter being in ecclesiastical controversy, in which he was reckoned what is called a Low Churchman; and having, previously to the Revolution, taken the opposite side, he was often severely handled by the other party. In particular, a sermon which he preached at the funeral of the first duke of Devonshire was severely animadverted upon, as if he gave too flattering a view of the character of the deceased for the sincerity of a Christian divine.

There is an octavo volume, published in 1730, entitled 'The Life of the Right Reverend Dr. White Kennett, late Lord Bishop of Peterborough,' from which the above particulars have been derived. It is anonymous; and as the fact is not generally known, it may not be improper to state that the author was William Newton, rector of Wingham in Kent.

KENNICOTT, BENJAMIN, was born of humble parents, at Totness in Devonshire, April 4th, 1718. Being appointed master of a charity-school in his native town, he continued in this situation till 1744, when several of his friends raised a sufficient sum of money to enable him to go to Oxford. He entered at Wadham College, and applied himself with the greatest diligence to the study of divinity and Hebrew. While he was an undergraduate he published a work 'On the Tree of Life in Paradise, and on the Oblations of Cain and Abel,' which was so well received by the public that the university allowed him to take his degree before the usual time, without the payment of the customary fees. He was elected a Fellow of Exeter College shortly afterwards, and took his degree of M.A. in 1750. He continued to reside at Oxford till the time of his death, which happened September 18th, 1783. He was a canon of Christ Church, and librarian of the Radcliffe Library, to which office he was appointed in 1767.

The most celebrated of Kennicott's works is his edition of the 'Hebrew Bible,' which was published at Oxford in 2 vols. fol., the first volume in 1776, and the second in 1780. In 1753, Dr. Kennicott published a work 'On the State of the Printed Hebrew Text of the Old Testament,' which was succeeded by another volume on the same subject in 1759. The first volume contained a comparison of 1 *Chron.* xi. with 2 *Sam.* v., xxiii., with observations on 70 Hebrew manuscripts, in which he maintained that numerous mistakes and interpolations had crept into the Sacred Text. In the second he gave an account of numerous other manuscripts of the Hebrew Bible, and proposed an extensive collation of Hebrew Manuscripts, with the view of publishing a correct edition of the Hebrew Bible. This undertaking met with much opposition from several persons, who were afraid that such a collation might overturn the received reading of various important passages, and introduce uncertainty into the whole system of Biblical interpretation The plan was however warmly patronized by the majority of the clergy, and nearly 10,000*l.* were subscribed to defray the expenses of the collation of the manuscripts and the publication of the work. Several learned men were employed both at home and abroad, and more than 600 Hebrew manuscripts, and 16 manuscripts of the Samaritan Pentateuch, were collated either wholly or in the more important passages. The business of collation continued from 1760 to 1769, during which period Dr. Kennicott published annually an account of the progress which was made. Though the number of various readings was found to be very great, yet they were neither so numerous nor by any means so important as those that are contained in Griesbach's edition of the New Testament. But this is easily accounted for from the revision of the Hebrew text by the Masorites in the seventh and eighth centuries, and from the scrupulous fidelity with which the Jews have transcribed the same text from that time.

'The text of Kennicott's edition was printed from that of Van der Hooght, with which the Hebrew manuscripts, by Kennicott's direction, were all collated. But as variations in the points were disregarded in the collation, the points were not added in the text. The various readings, as in the critical editions of the Greek Testament, were printed at the bottom of the page, with references to the corresponding readings of the text. In the Pentateuch the variations of the Samaritan text were printed in a column parallel to the Hebrew; and the variations observable in the Samaritan manuscripts, which differ from each other as well as the Hebrew, are likewise noted, with references to the Samaritan *printed* text. To this collation of manuscripts was added a collation of the most distinguished editions of the Hebrew Bible, in the same manner as Wetstein has noticed the variations observable in the principal editions of the Greek Testament. Nor did Kennicott confine his collation to manuscripts and editions. He further considered that as the quotations from the Greek Testament in the works of ecclesiastical writers afford another source of various readings, so the quotations from the Hebrew Bible in the works of Jewish writers are likewise subjects of critical inquiry. For this purpose he had recourse to the most distinguished among the Rabbinical writings, but particularly to the Talmud, the text of which is as antient as the third century.' (Marsh's *Divinity Lectures*, part ii.)

Kennicott annexed to the second volume a 'Dissertatio Generalis,' in which he gives an account of the manuscripts and other authorities collated for his work, and also a history of the Hebrew text from the time of the Babylonian

captivity. This dissertation was reprinted at Brunswick in 1783, under the superintendence of Professor Bruns, who had collated a great number of manuscripts for the original work.

An important Supplement to Kennicott's Hebrew Bible was published by De Rossi, under the title of 'Variæ Lectiones Veteris Testamenti,' Parma 1784-88, 4 vols. 4to.; to which an appendix was added in 1798.

The works of Kennicott and De Rossi are too bulky and expensive for general use. An edition of the Hebrew Bible, containing the most important of the various readings in Kennicott's and De Rossi's volumes, was published by Doederlein and Meissner, Leip. 1793; but the text is incorrectly printed, and the paper is exceedingly bad. A far more correct and elegant edition of the Hebrew Bible, which also contains the most important of Kennicott's and De Rossi's various readings, was published by Jahn, Vienna, 1806, 4 vols., 8vo. which may be recommended as the best critical edition of the Hebrew Bible.

Two scholarships were founded at Oxford by the widow of Dr. Kennicott for the promotion of the study of the Hebrew language.

KENT, a maritime county in the south-eastern corner of England. It is bounded on the north by the æstuary of the river Thames, by which it is separated from the counties of Middlesex and Essex; on the east by the German Ocean and by the Straits of Dover; on the south by the county of Sussex, from which it is separated in one part by the River Rother, in another part by the Teyse, or Teise, a feeder of the Medway; and in the south-western corner of the county by Kent Water and other branches of the Medway: on the west side the county is bounded by Surrey. A detached portion of the parish of Woolwich in Kent lies on the north side of the Thames.

The form of the county is irregular. Its principal dimensions are as follows: length of the northern boundary, from the neighbourhood of London to the North Foreland, 64 miles in a straight line; of the southern boundary, from the junction of the three counties, Kent, Surrey, and Sussex, to Denge Ness, or Dungeness, 43 miles; of the eastern boundary, from the North Foreland to Denge Ness, 38 miles; and of the western boundary, from the neighbourhood of London to the junction of the above counties, 24 miles: the length of a diagonal drawn from London to Denge Ness is 59 miles; and of one from the North Foreland to the junction of the above counties, 62 miles. The area is estimated at 1557 square statute miles; the population in 1831 was 479,155, giving 308 inhabitants to a square mile. In size it is the ninth of the English counties; in population the sixth; and in density of population the seventh. Maidstone, the county town, is on the Medway, 31 miles from London in a direct line south-east, or 34½ miles by the road by Eltham, Farningham, and Wrotham.

Coast-line, Islands, &c.—The northern part of the county, along the æstuary of the Thames, is skirted by a line of marshes extending inland from the Thames a distance varying from a few yards to a mile and a half or two miles. At the junction of the æstuaries of the Thames and the Medway these marshes are very extensive, and occupy a large portion of the tongue of land between these rivers, the extremity of which, being nearly or quite insulated by Yantlet Creek, forms what is termed the Isle of Grain.

Eastward of the Isle of Grain, the Swale, an arm of the æstuary of the Medway, cuts off from the main land the Isle of Sheppey, of which the isles of Elmley and Harty are subordinate portions, nearly severed from the rest by ditches or creeks. The northern side of the Isle of Sheppey is upland; the face toward the Thames is abrupt but not very lofty, the cliffs rising about ninety feet above the river. The southern part of the island is a low flat. The length of the island from east to west is about 10 miles; its greatest breadth from north to south about 5 miles. It probably once extended farther on the north side, but the cliffs have been gradually washed away. Its area is nearly 33 square miles, divided between seven parishes; it comprehends the antient but decayed borough of Queenborough, and the royal dockyard and town of Sheerness at its north-western point. The population of the island in 1831 was 9934. The surface is laid down for the most part in grass: but the upland part on the northern side produces good corn. The air is loaded with vapours in the low marshy grounds, and the water is brackish; the population is thin, except in and about Sheerness. The Isle of Sheppey constitutes a separate liberty (with the exception of Harty Island, which is in Faversham hundred), and had formerly a 'Court of Hustings for the trial of all causes or pleadings relating to the island. The marshes terminate east of the Swale, and the coast again rises to some height in clayey cliffs, which, with a slight interruption at Herne Bay, extend to Reculver and the flats which form the western limit of the Isle of Thanet. In the Isle of Thanet, which occupies the north-eastern corner of the county, the cliffs again commence and continue along the whole line of coast to Pegwell Bay, which is the boundary of the Isle to the south-east. The North Foreland is on the coast of the Isle of Thanet, due east of Margate.

The Isle of Thanet contains about 40 square miles with a population in 1831 of 26,090, and includes the well-known watering places, Margate, Ramsgate, and Broadstairs. It is now separated from the mainland only by the narrow channels of the Stour, one of which runs through the marshes to the æstuary of the Thames at Reculver, and the other enters the German Ocean in Pegwell Bay. The coast from the Isle of Sheppey to the North Foreland is skirted by sands which extend from a quarter of a mile to a mile from high-water mark; and for some miles farther out by 'the flats,' which, except in Margate Roads, rarely afford, when the tide is out, more than two fathoms water. Margate Roads are sheltered to seaward by Margate Sands, which are dry at low water.

The chalk cliffs of the Isle of Thanet are succeeded by the low coast of Pegwell Bay, which continues to Walmer Castle near Deal. Here the chalk cliffs recommence and continue round the South Foreland (a headland bearing 14 miles nearly due south from the North Foreland), to Sandgate between Folkestone and Hythe. Between Dover and Folkestone a portion of the chalk cliffs has fallen forward towards the sea, so as to present an under cliff similar to that at the back of the Isle of Wight. From the neighbourhood of Folkestone the coast begins to get lower until it forms the extensive tract of Romney Marsh, the coast line of which extends south-west to Denge Ness, a point 19 miles in a straight line south-west of the South Foreland, and from thence westward 6 or 7 miles to the border of the county of Sussex. Romney Marsh is in one part protected against the sea by an embankment called Dymchurch Wall. There are lighthouses at the North and South Forelands, and on Denge Ness, and beacons in various other places. Opposite to the coast which extends from the Isle of Thanet to the South Foreland lies the Goodwin Sand, the channel between which and the Kentish coast is the well-known roadstead of the Downs. The popular tradition is that the Goodwin Sand was once an island, forming the estate of Goodwin earl of Kent. This island, which some suppose to have been called Lomea, is said to have been destroyed by the sea, A.D. 1097. Others, with more probability, consider it to have been a shallow previously covered with a depth of water sufficient to admit the passage of vessels over it, but made bare about the above-mentioned period by the accumulation of sand. There has been an impression that the sand was possessed of a peculiarly 'voracious and ingurgitating property; so that should a ship of the largest size strike on it, in a few days it would be so wholly swallowed up by these quicksands, that no part of it would be left to be seen.' More accurate observers have however found that the sand is of the same quality with the sands on the opposite shore. The Goodwin Sand is of irregular form, about 10 or 11 miles long from north to south; its greatest breadth is three or four. It is divided into two parts by a narrow channel called 'the Swatch,' navigable by small boats.

The Downs, which are about 8 miles in length and 6 in width, are a safe anchorage, and are the general rendezvous of shipping leaving the Thames for the Channel, or returning homeward. They are sheltered on the west and north-west, and partially on the north sides, by the Kentish coast or by the sands connected with it: on the east side the Goodwin Sand forms a sort of breakwater. To the north of the Downs are 'The Small Downs,' a smaller roadstead immediately contiguous to the Downs properly so called.

Surface and Geology.—Kent is on the whole a hilly county. The chalk range of the North Downs enters the county on the west side from Surrey, not far from Westerham, and runs to the east-north-east to the valley of the Medway between Maidstone and Rochester. The southern slope of this chalk range is steeper than the northern, and

forms a line of hills, from the summit of which there is an extensive prospect. The North Downs are interrupted between the border of the county and the Medway by the valley of the Darent. On the eastern side of the Medway, which completely interrupts the chalk range, the Downs rise again, and run to the east-south-east to the coast near Folkestone, still presenting their steepest slope to the south. This part of the range also is divided into two parts by the valley of the Stour. On the north side the Downs gradually subside towards the æstuary of the Thames. The coast line from Walmer to Folkestone shows a transverse section of this range.

The breadth of the chalk formation, which thus extends through the county from west to east, varies; west of the Stour it is from three miles to six; east of the Stour it occupies the whole extent of the county north of a line drawn from Folkestone to Wye, except where it is interrupted by the marshy valley which surrounds the Isle of Thanet. The height of the chalk hills is considerable. Hollingbourne station, about midway between the valleys of the Medway and the Stour, is 616 feet above the level of the sea; Paddlesworth hill, about three miles north-west of Folkestone, is 642 feet; Folkestone hill, on the coast near Folkestone, is 575 feet; and Dover Castle hill is 469 feet. The cliffs near Dover are about 400 feet high. The cliffs of the Isle of Thanet are also of chalk; those about the North Foreland are from 100 to 200 feet high.

The district between the chalk range and the æstuary of the Thames is, for the most part, occupied by the plastic clay which immediately overlies the chalk. The tongue of land between the Medway and the Thames, including the Isle of Grain and the Isle of Sheppey, is formed of the London clay, which overlies the plastic clay. This formation also occupies a considerable district north and north-west of Canterbury, extending to the shore between Whitstable and Reculver, where (as well as in the Isle of Sheppey) it forms cliffs: those between Whitstable and Reculver are in some places 70 feet high. The London clay also covers a small tract near Pegwell Bay. The hills of Sheppey, which are of London clay, rise to the height of 200 feet. Shooters Hill, near Woolwich, which is an insulated mass of London clay, is about 446 feet high.

In the valleys of the Darent and its feeder the Cray the strata above the chalk have been washed away, and the chalk is covered only by the vegetable soil. Another strip of chalk, denuded of the superior strata, runs along the bank of the Thames from the valley of the Darent to below Gravesend.

South of the North Downs the chalk marl and green sand crop out, and cover a belt of land skirting the chalk throughout the whole extent of the county from west to east. The breadth of this belt varies from two miles to six or seven. Its southern slope, which is the steepest, forms what is designated 'the ragstone range' of hills, the higher points of which are from 600 to 800 feet high, and overlook the valley watered by the Eden, the Medway (from Penshurst to Yalding), and the Beult. The thickness of the chalk marl averages 300 to 400 feet; of that of the green sand we have no account.

The valley just referred to is occupied by the Weald clay, and forms another belt extending throughout the county from the border of Surrey to the edge of Romney Marsh, having an average breadth of five miles. The thickness of this formation may be estimated at about 300 feet.

The remaining portion of the county, which forms a narrow belt or strip of land along the Sussex border, is occupied by the iron-sand, which forms the nucleus of the great Weald district of the south-eastern part of England. This formation constitutes a range of hills, amid which the upper waters of the Medway and its tributary the Teyse have their sources; and extends far into Sussex. It rises in some parts of the Weald clay district through the overlying strata of that formation.

The county thus appears, when viewed with reference to its geology, to consist of five parallel belts, extending nearly in the direction of its length, and occupied by different formations, which succeed each other in regular order from north to south:—1, The London and plastic clays; 2, the chalk; 3, the chalk marl and green sand; 4, the Weald clay; 5, the iron-sand. The southern border of the chalk and green-sand formations, and the iron-sand district, form three parallel ranges of hills separated from each other by the Homesdale and Weald clay valleys, the former lying at the foot of the chalk hills, and the latter of the ragstone or green-sand hills.

What is termed the Weald (Saxon peald, a forest, or perhaps generally, a wild uncultivated tract) was antiently an immense forest, inhabited only by deer and hogs. It has however been gradually cleared and brought into cultivation. The iron-sand of this district was formerly much in request for the furnace and the forge; and the iron-works were numerous and important. But the introduction of coal in the manufacture of iron has caused this branch of industry to be transferred to other parts of the island where fuel is more abundant.

Beds of limestone occur in the green-sand formation, and are quarried near Maidstone for common purposes of building, for road-making, and for burning into lime, which is used for stucco, or exported to the West Indies for refining sugar.

Hydrography and Communications.—The northern boundary of the county is formed by the Thames, to the basin of which nearly the whole county belongs. This river affords to that side of the county a ready means of communication with the metropolis and with other parts. The royal dockyards of Deptford and Woolwich are upon it.

The other principal rivers are the Ravensborne, the Darent, and the Medway, which flow into the æstuary of the Thames; and the Stour, and the Rother, which flow into the sea.

The Ravensborne rises on Keston Common, near the border of Surrey, and flows northward past the town of Bromley and the village of Lewisham, and between the towns of Greenwich and Deptford, into the Thames. It turns several mills, and supplies Greenwich and Deptford with water by means of waterworks. It is navigable for nearly a mile up to Deptford bridge for lighters and other small craft. The whole length of the Ravensborne is about ten miles.

The Darent rises in Squirries park, near Westerham, just under the North Downs, and close to the border of Surrey. Its course is first east-north-east, parallel to the course of the North Downs, to Riverhead near Sevenoaks, where it turns north and passes through a depression in the Downs by Otford, Shoreham, Farningham, and other villages, to the town of Dartford, below which it is called Dartford Creek, and becoming navigable, flows through the marshes into the Thames. Its whole course is about twenty miles, for three of which it is navigable. Just before joining the Thames it receives the Cray, which rises near Orpington, and has a course of about nine miles. The Cray is said to produce the best trout of any stream in the neighbourhood.

The Medway rises in Sussex, near the northern border, between East Grinsted and Crawley, and flows eastward through that county into Kent, which it enters near Ashurst about five miles west of Tunbridge Wells. In this upper part of its course the Medway is swelled by many brooks, which drain the higher districts of the Weald of Sussex. At Penshurst, in Kent, the Medway is joined by the Eden, one of its main branches, which rises about Godstone, in Surrey, and receives the drainage of the valley that separates the green-sand hills from the central iron-sand high lands of the Weald. The Eden is about sixteen miles long. The length of the Medway before it receives the Eden may be estimated at eighteen miles. From Penshurst, where the navigation of the river commences, it flows east-north-east five miles to Tunbridge, forming in its way two or three islands. From Tunbridge the Medway flows eight miles east by north to Yalding, in the Weald, near which it is joined by the Toyse or Teise and the Beult. The Teise rises in the northern part of Sussex, and flows by Lamberhurst and between Horsmonden and Goudhurst into the Medway. Its length is about seventeen miles. It sends off an arm which joins the Beult. This river rises in the Weald of Kent, not far from the foot of the iron-sand hills, near Shadoxhurst, and flows north-by-west twenty miles to Yalding. The course of the Medway and of its principal feeder the Beult to their junction is in the direction of the valley of the Weald clay, of which they receive the drainage, the Beult of the eastern, and the Medway of the western part. From Yalding the course of the Medway, though very winding, is for the most part northward; it passes through an opening in the green-sand hills, across the prolongation of the valley of Holmsdale by Maidstone and Aylesford, through a great opening in the North Downs, and by Rochester and Chatham,

into the æstuary of the Thames at Sheerness. Its length below Yalding is more than thirty miles, and its total length above sixty, for more than forty of which it is navigable. The tide flows up to Maidstone bridge, just above which it is now stopped by a lock; it previously flowed a mile or two higher up. Ships and large vessels cannot ascend above Rochester bridge. Below Rochester the æstuary gradually expands to a considerable width, and forms an important harbour for the British navy. Numerous arms of the river or creeks penetrate the marshes, which spread inland to a considerable extent from the banks of the river. The royal dockyard of Chatham is on the Medway, and that of Sheerness at the junction of the Medway with the Thames. The Medway is plentifully stored with fish: above Maidstone is an abundance of the usual fresh-water fish; and below Rochester are soles, flounders, and other flat fish, and smelts of excellent quality and large size. In the creeks in the lower part of the river are considerable oyster-beds.

The British name of this river is said to have been Vaga, but if a judgment may be formed from the name given by Nennius to the town of Maidstone, 'Caer Meguaid' or 'Caer Megwad,' the first syllable of the modern name was also part of the British name, and not (as supposed by some) a Saxon addition. The Romanized name of a town mentioned in the Peutinger Table, and by Richard of Cirencester, supposed to be on this river, was Ad Madum or Madis, which corroborates the notion that 'Mag' or 'Mad' formed part of the British name.

The Stour has two main branches, distinguished as the Greater and the Lesser Stour. The Greater Stour is formed by two streams, which flow along the valley between the North Downs and the green-sand hills in opposite directions, one coming from the north-west near Lenham, the other from the south-east, not far from Hythe on the coast; they unite near Ashford, and, turning to the north-east, pass through a depression in the North Downs, and flow by Wye and Canterbury to the neighbourhood of Sarre in the Isle of Thanet. Here the Stour parts into two branches, one of which falls into the æstuary of the Thames, near Reculver; the other falls into Pegwell Bay, below Sandwich. These two arms cut off Thanet from the rest of the county, and constitute it an island.

The Lesser Stour rises near Lyminge, about three miles north of Hythe, and, flowing north by east to Barham, above which it sometimes becomes dry, turns north by west, and skirting Barham Downs, flows to Bridge near Canterbury. Here it makes another bend, and runs north-east into that arm of the Greater Stour which falls into Pegwell Bay. The two arms of the Stour, which insulate Thanet, were once a channel three or four miles over, which received several streams beside the Greater and Lesser Stour. This channel was called the Wantsume. In Bede's time the breadth was diminished to three furlongs, and was usually passable at two places only, Sarre and Stonar, near Sandwich, where ferry boats were kept. The channel continued to be navigable for ships of tolerable burden in the reign of King Henry VIII.; but subsequently the waters of the northern branch having been distributed by means of floodgates over the land, this arm from the Stour to Reculver became too small for navigation, and was for a period quite dry in the neighbourhood of Sarre, so that Thanet became a peninsula rather than an island. A cut from the Stour restored the continuity of the watercourse, but this north channel has never since been used for navigation. The Greater Stour enters Pegwell Bay after making a great bend, at the elbow of which Sandwich is situated. It is navigable up to Fordwich, near Canterbury. The whole length of the river from Lenham to Pegwell Bay may be estimated at forty-five miles. Both the Greater and the Lesser Stour contain excellent trout; salmon trout, generally of about nine pounds weight, are taken in the Greater Stour, and a peculiar species called the Fordwich trout, which are rather larger.

The river Rother rises in Sussex, to which county it more properly belongs. [SUSSEX.] It first touches the border of Kent at the junction of a small stream, which rises near Hawkhurst, and separates the two counties. From this junction the Rother flows by Newenden and Wittersham, below which it quits the border and re-enters Sussex. Several small streams from the Weald of Kent flow into it, and the arms of these, with the Rother itself, enclose the river island of Oxney (six miles long from east to west, and three miles broad), the centre of which is occupied by the hills about Wittersham, Stone, and Ebony Chapel, while the rest of the island (of which the greater part is in Kent) forms the continuation of Romney Marsh. The Rother is navigable in all that part which touches this county. This river, which was antiently called the Limene, once entered the sea at New Romney, but in the reign of Edward I., during a great inundation of the sea, it forsook its antient channel and formed for itself a new one into the sea at Rye.

The principal canal in the county of Kent is the Royal Military Canal, which was formed, rather for the purposes of defence than of commerce, during the alarm of invasion in the late war against Napoleon. It has however since been converted to commercial use. It runs along the edge of Romney Marsh from its commencement in the sea near Hythe to its junction with the Rother in the south-eastern corner of Oxney Isle. The line of this canal is very little above the level of the sea.

An act was obtained in 1812 for a canal to be cut from the Medway, just above the junction of the Teyse, to Ashford. It was to take a circuitous course through the Weald, and to have a branch by Tenterden to the Royal Military Canal. Nothing has ever been done under this act.

A canal, about nine miles long, extending from Gravesend to Frindsbury, opposite Chatham, unites the Thames and the Medway, and saves a circuitous navigation of forty-seven miles round the extremity of the Isle of Grain. It passes, by a tunnel about two miles long, through the chalk hills. There is a basin at each end of the canal.

Three principal roads traverse the county. The Dover road enters the county at New Cross, 3½ miles from London, and runs east-south-east in a very direct line through Deptford, Greenwich, Dartford (15 miles from London), Gravesend (22 miles), Rochester and Chatham (30 miles), Sittingbourne (40 miles) and Canterbury (55 miles) to Dover (71 miles). The principal communication between London and the Continent is by this road. The Hythe road branches off from the Dover road at New Cross, and runs south-east through Eltham, Farningham, and Wrotham, to Maidstone (34½ miles); and from thence by Lenham (44 miles), Charing, and Ashford (53 miles), to Hythe (65 miles). The Hastings road branches off from the Hythe and Maidstone road more than a mile beyond New Cross, and diverging more towards the south, passes through Bromley, Seven Oaks (24 miles), and Tonbridge (30 miles); at Lamberhurst (40 miles); it crosses a projecting angle of Sussex, and finally quits Kent for Sussex near Flimwell (45 miles). The road travelled by the Hastings mail diverges from this road at Tonbridge, and passes through Tonbridge Wells (36 miles from London). The road to Rye branches off from the principal Hastings road just before it quits Kent, and passes through Hawkhurst and Newenden (53 miles), where it crosses the Rother into Sussex. The roads to Margate and Ramsgate, and to Sandwich and Deal, branch off from the Dover road at Canterbury, and a branch from the Hastings road near Lamberhurst leads to Cranbrook and Tenterden, in the Weald, and to New Romney near the sea. A railroad from London to Dover is in progress. It is to branch off from the Brighton railroad about 20 miles from London, and to pass by Tunbridge, and from thence in a tolerably direct line by Ashford to Folkestone. From Folkestone it will pass by a road along the face of the cliffs and by a tunnel through Shakspeare's Cliff to the town of Dover.

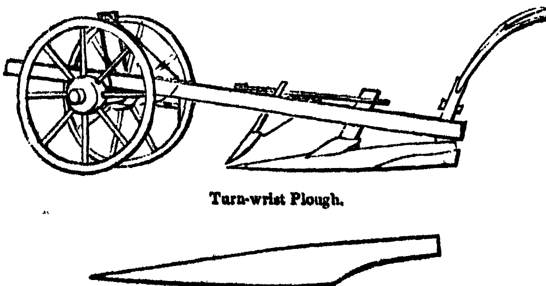
Agriculture.—The climate of Kent is in general mild and genial. The proximity to the continent of Europe exposes it to occasional north-east winds, which chill the air, but they carry off the superfluous moisture of the soil; and some of the most fertile spots are in the Isle of Thanet, which lies at its north-eastern extremity, and in the adjacent parts. The soil of this county may be divided into the gravel, chalk, and clay, which produce, where they mix in due proportions, an extremely fertile loam. The alluvial soils along the Thames and Medway, and in Romney Marsh, produce some of the richest marsh pastures in the kingdom.

A ridge of hills composed of ragstone traverses the county from west to east, along which there are some very fertile clays, which, with moderate attention to the cultivation, are highly productive. The chalk, which lies chiefly to the north of these, rises into hills between Canterbury and Dover, where there are some extensive sheep-downs,

but from Canterbury towards London it is mostly covered by a stiff clay, and only breaks out here and there on the banks of the Thames. To the south of the ragstone hills are the Wealds, which contain some very fertile clays and woods, in which oaks grow to a great size. The soil in the Isle of Thanet is not naturally so fertile as the appearance of the crops might lead one to suppose. It consists mostly of a thin light soil; but it has been so long improved by careful cultivation and abundant manuring, chiefly with sea-weed, that it may now be considered one of the most fertile spots in Great Britain. The subsoil is everywhere a hard chalk, over which there is in some places a thin layer of earth mixed with flinty pebbles, not exceeding six or eight inches in depth: in some of the hollows the soil is deeper and more loamy, and so dry as to allow of its being ploughed quite flat without any ridges or water-furrows. There is not an acre of waste land in all the Isle of Thanet.

Throughout the whole county the clay may be said to predominate, and the mode of cultivation generally adopted is that which suits the strongest soils. The Kentish farmers and yeomen, though generally rich and independent, are not very ready to introduce improvements in the system by which their forefathers were enriched; and although a great quantity of corn is annually raised in the county, and contributes a great portion of the supply of the London market, it cannot be denied that this produce might be greatly increased, and raised at a less expense than it is now, by adopting improvements in the tillage of the land and the implements in use. An old Kentish farmer may perhaps smile at this assertion, and, looking at his fine fields of wheat and beans, defy any one to cultivate the land better. This is the very reason why improvements which have been introduced in less productive districts have made little or no progress in this county. In the year 1793, Mr. John Boys, who drew up the general view of the county of Kent, being himself a Kentish farmer, mentioned the heavy turn-wrist plough, used almost universally throughout Kent, as 'drawn by four horses on the lightest soils, and with six on all the stiffest;' and at this day, nearly half a century later, the old heavy turn-wrist plough is still used with four horses in soils where a good plough of an improved form would readily do the same work with two.

The Kentish turn-wrist plough consists of a beam ten feet long, five inches deep, and four broad, behind which is a foot five inches by three and a half, and three and a half feet long, on the top of which the handles are fixed. Through the beam, at two feet five inches from the foot, is a sheath of oak seven inches wide and one and a half thick, which is morticed into the chep in an oblique direction, so that the point of the share is twenty-two inches distant from the beam. The chep, to which the share is fixed, is five feet long, four inches wide, and five inches deep. The share is of hammered iron, weighs about 32 lb., is twenty inches long, and from four and a half to seven inches wide at the point. The upper end of the beam rests on a carriage with two wheels three feet two inches high: on the axletree is a gallows, on which is a sliding bolster to let it up and down. Through the centre of the axle is a clasp-iron, to which is fixed a strong chain called a tow. This comes over the beam, and, by lengthening it, the beam is let out a greater length from the axle, and thus the



Turn-wrist Plough.

Share of the turn-wrist Plough. The point is flat, like a chisel, for stiff clays, and with a blunt point for stony soils.

plough goes to a greater depth in the ground; by shortening it the reverse takes place.

We do not mean to disparage this plough for heavy soils, nor doubt the necessity of its being drawn by four horses in some very stiff clays; but it might be greatly improved, and the draught diminished, so as to save at least one horse in four. In clay soils, which are retentive of water, it is always advantageous to lay the land in stitches with deep water-furrows between them; and for this purpose the Suffolk or the Scotch ploughs with a fixed turn-furrow are much better adapted than the turn-wrist.

On the soils in the Isle of Thanet, where wheat and beans are raised alternately without fallow or intermission, the practice is good, and, if effected at a moderate expense, is not to be found fault with. The ground is well stirred and amply manured for the beans, which are drilled in rows with wide intervals, and repeatedly horse-hoed till the crop is too far advanced to admit of it. The returns cannot fail to be good. The bean stubble is cleared of the stems and roots of the beans by a plough with a very broad share, which effects a perfect hoeing and leaves the surface quite clean. A deep ploughing is then given for the wheat. We cannot suggest any improvement in this practice, unless it be in the economy of the labour. But such soils are very scarce, and much of the Kentish clays and loams must be cultivated with a greater variety of crops. There is room here for improvement, both in the rotations and in the manner in which each crop is raised; and the Kentish farmer might find it profitable to adopt some of the methods which experience has fully proved to be advantageous in soils and situations not so well adapted to them as many parts of Kent are. A journey through the northern counties of England and the south of Scotland would give the young Kentish farmer some useful hints, and would remove some prejudices which impede his progress in agriculture.

Besides the usual crops which are raised on good clays, Kent produces several which are peculiar to it, such as canary and radish seed, which grow chiefly in the Isle of Thanet, where there are few hedgerows to harbour birds, which are very destructive to these crops. The canary seed is cut in September, and is left for some time in the field until it is fit to be thrashed; for the seed adheres so strongly to the husk that it requires the influence of rain and exposure to the weather for some time to destroy the texture of the envelopment before it can be separated; and it suffers very little from this exposure. The produce is from three to five quarters per acre, and is chiefly used to feed birds kept in cages, and for this purpose is largely exported. The offal is very good food for horses. Radish seed is also cultivated in the richer soils for the London seedsmen. It is sown in drills and carefully hoed, so as to leave the plants eighteen inches asunder. The pods, when ripe, require to be left long in the field before the seed can be thrashed out. The produce is from eight to twenty-four bushels per acre. The demand for this seed is very great: every garden, however small, has a bed of radishes, and few gardeners think it worth while to save the seed.

Other seeds are likewise raised for the London seedsmen, such as spinach, cresses, and white mustard. Kidney beans are cultivated to a considerable amount in the neighbourhood of Sandwich, and produce from ten to twenty bushels per acre.

Woad and madder were formerly more commonly cultivated in Kent than they are now; the foreign, being raised at a less expense, have driven the Kentish out of the market. With a greater attention to the management of these valuable crops, they might probably still be raised advantageously; but everything which is done in Kent is done in a more expensive manner than in many other countries; a great proof of the easy circumstances of the farmers and landowners there.

There is comparatively a very small proportion of grass land in Kent, if we except the sheep downs on the chalk hills and the marshes. The marshes produce most of the hay consumed in winter. Romney Marsh, which is well known for the richness of its grass, contains about 44,000 acres; on the borders of the Stour are 27,000; and along the Medway, Thames, and Swale, about 11,500 more. A great many sheep are reared and fattened in these marshes. The cattle fed there are only a secondary consideration, sheep being found more profitable. The quantity of sheep which the land will keep varies from two to five per acre; sometimes the grass grows faster than the flock can consume, and becomes too rank, a circumstance which is owing to want of attention in stocking, and is detrimental. Lean cattle are then taken in to eat it close;

but a careful farmer never allows his marshes to be either over or under stocked, and keeps the grass close fed and yet abundant. The hay made in the marshes is often stacked in the marsh itself, near some shed, where the stock may be supplied in winter.

There are very few dairies of any consequence in Kent, nor is any cheese made, except for domestic consumption.

Hops are grown to a very great extent in this county; and, with the exception of those which are raised at Farnham in Surrey, are the most esteemed of any in England. [HOPS.]

In that part of Kent which is nearest to London there are many extensive gardens; and about Deptford hundreds of acres are laid out in asparagus beds. Great quantities of peas are also raised for the London market on the line of road from London to Rochester. Apples, pears, plumbs, and cherries are raised in orchards, and the produce sent to the London market. Cider is also made in considerable quantities. In some places hops, apples, cherries, and filberts may be seen growing together in the same grounds; the proportion is 800 hop hills, 200 filberts, and 40 apple or pear trees per acre. The hops last twelve years, the filberts thirty; after which the apples and pears require the whole ground. This is a very good arrangement, by which the land is constantly producing.

The cultivation of the filberts is peculiar to Kent, and very well managed there, especially in the neighbourhood of Maidstone. They do not require a very rich soil, but grow well in that which is rocky and gravelly. The ground is kept clean around the trees, which stand about 12 feet apart. They are very carefully pruned, and one stem only is left to branch out a few inches above the ground; the branches are trained and pruned in the shape of a punch-bowl, and are not allowed to run above 4 or 5 feet high: thus they will bear abundantly, and be very profitable. When the filberts are gathered, they are laid to dry in the sun or under a shed exposed to the air. If they are well dried, they will keep good for several years.

There are still some extensive woods in Kent, but they are diminishing every year; and the produce of bark and timber is much reduced from what it formerly was. The demand for hop-poles has caused more attention to be paid to underwood; and some of the coppices, which are well managed, give a sufficient return to prevent their being grubbed up and converted into arable land.

On a general review of the agriculture of this county, it may be observed, that notwithstanding its present productive state, and the natural fertility of many parts, it is capable of very great improvement, and that by a little attention, and a judicious outlay of capital in draining and liming where it is required, and especially by a more economical application of agricultural labour, both in men and horses, its produce might be greatly increased, and raised at much smaller expense than it is at present.

Divisions, Towns, &c.—Kent has been long divided into five lathes. These divisions, in the opinion of some writers, take their name from the Saxon ȝe-laðian, to assemble; they had formerly distinct courts superior to the hundred courts; each of them comprehends several hundreds, and other smaller divisions. The lathes are as follows:—

I. *Sutton-at-Hone Lathe* occupies the western extremity of the county. It is bounded on the north by the Thames, on the west by Surrey, on the south by Sussex, and on the east by an irregular line drawn from the Thames just above Northfleet to the border of the county near Penshurst. It comprehends an area of 173,440 acres, and had in 1831 a population of 135,951. It includes the following hundreds:—

1. Axton (or Axtane, or Clackstone), Dartford, and Wilmington; 2. Blackheath; 3. Bromley and Beckenham; 4. Codsheath; 5. Little and Lesnes or Lessness; 6. Ruxley; 7. Somerden; 8. Westerham and Eatonbridge.

II. *Aylesford Lathe* is on the western side conterminous with Sutton-at-Hone Lathe; on the north it is bounded by the Thames, on the south by Sussex, and on the east by a line drawn from the Medway at Rainham below Chatham, south-east to Otterden near Charing, from thence south-west to the neighbourhood of Headcorn, in the Weald, from thence north-west along the Beult to the junction of a stream flowing from the Teise, and from thence south along that stream and along the Teise to the Sussex border at Lamberhurst. It comprehends an area of 244,150 acres, and had in 1831 a population of 134,176. It is subdivided into the following hundreds:—

9. Brenchley and Horsmonden; 10. Chatham and Gillingham; 11. Eythorne, or Eyhorne; 12. Hoo; 13. Larkfield or Lavercefield; 14. Littlefield; 15. Maidstone; 16. Shamwell, or Shamel; 17. Toltingtrough, or Toltingtrow; 18. Twyford; 19. Washlingstone, or Watchlingstone; 20. Wrotham; beside the liberty of the city of Rochester, and the liberty of the Lowy of Tonbridge.

Hasted adds to the above West or Little Barnefield hundred, containing part of the parish of Goudhurst, but not the church.

III. *Scray Lathe* is on the western side conterminous with Aylesford Lathe. On the north it is bounded by the Thames, on the south by Sussex, and on the east by a tolerably regular line drawn from Sea Sâlter near Whitstable to Aldington Corner, six miles west of Hythe; and from thence by Orlestone and Appledore to the eastern end of Oxney Isle. It comprehends an area of 260,510 acres, and had in 1831 a population of 78,973. It includes the following hundreds:—

21. Barnfield (East); 22. Barclay, or Barkley; 23. Blackbourne, or Blacetune; 24. Boughton-under-Blean, or Bocton; 25. Calehill; 26. Chart and Longbridge; 27. Cranbrook; 28. Faversham; 29. Felborough, or Feleborg; 30. Marden; 31. Milton, or Middleton; 32. Rolvenden; 33. Selbrittenden; 34. Tenterden; 35. Teynham; 36. Wye.

The Liberty of the Isle of Sheppey is a part of Milton hundred, but has a constable of its own. According to Hasted, Chart and Longbridge, Calehill, Felborough, and Wye hundreds have long been detached from the Lathe of Scray, and annexed to that of Shipway or Shepway; but all our other authorities give them as being still included in Scray.

IV. *St. Augustine Lathe* (formerly called also *Hedclinth Lathe*) is conterminous on the west with Scray Lathe. On the north and east it is bounded by the sea; on the south it is conterminous with Shepway Lathe; the boundary line being drawn from the border of Scray Lathe, near the town of Wye, to Ewell near Dover, and from thence south to the sea at Hougham, between Dover and Folkestone. Its area is 166,760 acres, and it had in 1831 a population of 103,621. It comprehends the following hundreds:—

37. Bewsborough; 38. Bleangate, or Blengate; 39. Bridge and Petham; 40. Cornilo; 41. Downhamford; 42. Eastry, or Estrege; 43. Kinghamford; 44. Preston; 45. Ringslow, or Tenet, comprehending the Isle of Thanet; 46. Westgate; 47. Whitstable; 48. Wingham.

V. *Shepway* or *Shipway Lathe* is conterminous on the north with St. Augustine Lathe, and on the west with Scray Lathe and the county of Sussex, and is bounded on the other sides by the sea. Its area is 127,380 acres; its population in 1831 was 25,849. It contains the following hundreds:—

49. Aloesbridge; 50. Folkestone; 51. Ham; 52. Hayne, or Heane; 53. Hythe; 54. Langport; 55. Loningborough; 56. St. Martin Pountney; 57. Newchurch; 58. Oxney; 59. Stouting; 60. Street; 61. Worth; besides the franchise and barony of Bircholt, called a hundred by Hasted.

There are several parts of the county which have their particular 'liberties,' exempt from the jurisdiction of the county magistrates. They are as follows:—I. The county of the city of Canterbury, in St. Augustine Lathe. II. The city of Rochester, and—III. The borough of Maidstone, both in Aylesford Lathe. IV. The Liberty of Romney Marsh, comprehending the hundreds of Langport, St Martin Pountney, and Worth, and part of the hundreds of Aloesbridge, Newchurch, and Street, and of the barony of Bircholt, all in Shepway Lathe. The Marsh is under the jurisdiction of its own bailiff and jurats. V. The Liberty of the Cinque-Ports, which is partly in this county and partly in Sussex. The part which is in this county comprehends—1. Sandwich, including the borough of Sandwich; the ville of Sarr, in the parish of St. Nicholas, and the ville of Ramsgate, in the parish of St. Lawrence, in the Isle of Thanet; the town and parish of Deal, the parish of Walmer, and part of that of Woodnesborough, near Sandwich; and the parish of Fordwich, near Canterbury, all in St. Augustine Lathe: 2. Dover, including the town of Dover, with part of the neighbouring parishes of Charlton and Hougham, the parish of Ringswould, between Dover and Deal, and the town and parish of St. John, Margate:

the parishes of Birchington, St. Peter's, and Wood, or Woodchurch, in Thanet; the town and part of the parish of Folkestone, in Shepway Lathe; and the town and part of the parish of Faversham, in Scray Lathe. All these, except Faversham and Folkestone, are in St. Augustine Lathe: 3. Hythe, including the town and parish of Hythe, and part of the parish of West Hythe, in Shepway Lathe: 4. New Romney, including the town and parish of New Romney, part of the parishes of Old Romney, Appledore (in Scray Lathe), Brenzet, Ivechurch or Ivychurch, Snargate and part of Bromhill, all near Romney, and, except Appledore, in Shepway Lathe: 5. Rye, the liberty of which includes in this county the town of Tenterden, in the Lathe of Scray. [CINQUE-PORTS.]

The Liberty of Hastings formerly included in this county the parish of Beaksbourn, near Canterbury (St. Augustine Lathe), and the hamlet or ville of Grange, or Grench, in Gillingham parish, near Chatham, in Aylesford Lathe: but these were separated from it by the statute 51 Geo. III., c. 36.

Several other places, though not out of the jurisdiction of the county magistrates, are not under the constables of the hundred, but have constables of their own.

There are in the county two cities, Canterbury and Rochester; the Cinque-Ports of Dover, Hythe, New Romney, and Sandwich; the parliamentary boroughs of Greenwich (including Deptford and Woolwich), Chatham and Maidstone, and eighteen other market-towns, viz. Ashford, Bromley, Cranbrook, Dartford, Deal, Faversham, Folkestone, Gravesend, Lydd, Margate, Milton, Ramsgate, Sevenoaks, Sheerness, Sittingbourne (held monthly), Tenterden, Tonbridge or Tunbridge, and Westerham. There is a market held at long intervals at Eleham, or Elham, on the Lesser Stour, in order to prevent the forfeiture of the charter; and there were formerly markets at Aylesford, St. Mary Cray, Eltham, Goudhurst, Lenham, Town Malling, Queenborough, Smarden, Wrotham, and Wye. Of some of these places an account is given elsewhere. [ASHFORD; AYLESFORD; CANTERBURY; CHATHAM; DEAL; DOVER; GREENWICH (under which Deptford is included); MAIDSTONE; MARGATE; RAMSGATE; ROCHESTER; SANDWICH; SHEERNESS; WOOLWICH.] The others we shall notice here.

Hythe is locally in Hythe hundred, in the lathe of Shepway, 65 miles from London. It is called in antient records Hethe, and in Domesday Hede, from the Saxon hyð, a haven. This town is supposed to owe its origin to the decay of West Hythe and Lympne, or Limne (the Portus Lemanis of the Antonine Itinerary), which are now both inland. It was early a place of importance, being one of the Cinque-Ports, and having once had, according to Leland, a fair abbey and four parish churches. In the reign of Henry IV. the inhabitants of this town experienced such heavy calamities, pestilence, conflagration, and shipwreck, that they contemplated abandoning the place; but the king by the grant of a liberal charter induced them to remain. The parish of St. Leonard, Hythe, which coincides with the Cinque-Port, contains 860 acres, and had in 1831 a population of 2287, of which scarcely any part was agricultural. The town, which is at the foot of a steep hill or cliff, about half a mile from the shore, consists chiefly of one long street, parallel to the sea, with some smaller ones branching from it, or parallel to it. The townhall and market-place are in the centre of the town. The church is on the slope of the hill above the town; it is a cross church, very antient, with a west tower. Some of the western part of the church is of Norman architecture: the eastern part is early English, of remarkably good design and execution; this part of the church has bold buttresses, and under it a remarkably fine groined crypt. There are two hospitals, or almshouses, in Hythe, of antient foundation. There are barracks at the east end of the town, a small theatre, and a public library and reading-room. The market is on Saturday. The corporation of Hythe, under the Municipal Reform Act, consists of four aldermen or jurats, and twelve councillors. Hythe formerly returned two members to parliament, by the Reform Act it sends only one. The parliamentary borough includes the municipal borough, the Liberty of the town of Folkestone, and the parishes of West Hythe, Saltwood, Cheriton, and Folkestone, and part of that of Newington. These limits include the watering-place of Sandgate. The living of Hythe is a perpetual curacy united with the rectory of Saltwood; their joint annual value is 784*l.*, with a glebe-house; they are in the diocese of Canterbury, but exempt from the archdeacon's visitation. There were in 1833 in the parish ten day-schools with 197 children; two day and Sunday national schools with 238 children, and two Sunday-schools with 137 children.

About a mile north of Hythe are the ruins of Saltwood castle; the outer walls, which are partly remaining, enclose an elliptical area of three acres. These walls were strengthened by several square or circular towers, now much dilapidated. The keep, or gate-house, which was almost entirely rebuilt by Courtenay, archbishop of Canterbury, in the time of Richard II., is now occupied as a farm-house.

New Romney, in the lathe of Shepway, is situated near the sea, in Romney Marsh, and is 70 miles from London. The name appears to be of Saxon origin. The etymology given by Lye is Rumen-ea, from Rume, wide, spreading, *q.d.* the spreading water or marsh. Perhaps it may be from Rumen-eze, 'the island in the flat or marsh,' a spot sufficiently elevated from the surrounding marsh to be dry being termed an island, or 'ey,' by the Saxons. New Romney appears to have risen before the time of Edward the Confessor, from the decay of Old Romney (more inland), the haven of which was deserted by the sea. The haven of New Romney being commodious and well frequented, the town became important, and was made one of the cinque-ports, perhaps in the place of Old Romney, which, with Lydd, Denge Marsh (extending to Denge Ness), and Oswardestone, were added to it as subordinate members. But the Rother, which then entered the sea at this place and formed its harbour, having forsaken its channel (in the reign of Edward I.), the harbour was choked up with beach, and the town went to decay. In its flourishing time it is said to have been divided into twelve wards, and to have had five parish churches, as well as a priory and an hospital, of both which there are some remains. At present it is an insignificant place, built on a soil of gravel and sand, slightly elevated above the surrounding country. It consists chiefly of one wide well-paved street, with a market-house and a hall, or brotherhood-house, in which the mayor, jurats, and commons of the Cinque-Ports frequently hold their sittings. There is a weekly market and one yearly fair. The parish comprehends 2320 acres, and had, in 1831, a population of 983. The church is a very antient and handsome building. The lower part of the tower and part of the nave are of Norman architecture and of good composition; the upper part of the tower is of early English, and the remaining part chiefly of decorated English character, with large and fine windows. The living is a vicarage in the diocese of Canterbury, exempt from the archdeacon's visitation, of the clear yearly value of 161*l.*, with a glebe-house not fit for residence, in the gift of All Souls' College, Oxford.

There were, in 1823, two infant or dame schools, with 26 scholars, two day-schools with 50 scholars, and one national day and Sunday school with 142 children. Up to the passing of the Reform Act, Romney returned two representatives to the House of Commons; these, like the other members for the Cinque-Ports, were styled 'barons.' The first return of members from the town was in the reign of Edward I. It was disfranchised by the Reform Act; and is one of the polling-places for East Kent.

At the village of Dymchurch, about four miles north-east of New Romney, along the shore of Romney Marsh, is a sea-wall or embarkment of earth more than three miles in length, by which the marsh is preserved from the inundation of the sea. It is called Dymchurch wall. Its perpendicular height varies from fifteen to twenty feet above the general level of the marshes: at the side next the sea it has a slope of a hundred yards: the width of the top varies from fifteen to thirty feet. There are sluices through it for draining the marshes. Old Romney, from the decay of which New Romney arose, is now a mere village with a population of 113 persons.

Bromley is in Bromley and Beckenham hundred, in the lathe of Sutton at Hone, and near the Ravensbourne River, 10 miles from London Bridge. Bromley parish contains 4630 acres, and had in 1831 a population of 4002. The town consists principally of one street, with neat well-built houses, and having a market-house in the middle of the town supported on wooden pillars. The church contains the monuments of Dr. Hawkesworth, Dr. Zachary Pearce, bishop of Rochester, and several others. The bishop of Rochester's palace at Bromley is a plain brick mansion, rebuilt A.D. 1777. In the palace garden is a chalybeate

spring, 'St. Blaise's well,' of some repute. There is a well-endowed hospital or 'College,' founded in 1666 for clergymen's widows, and since much enlarged: there are now forty widows in the establishment. The buildings surround two quadrangular courts: there is a chapel, and a chaplain is attached to the foundation. There are some dissenting meeting-houses. There is a market on Thursday, at which, on the third Thursday in each month, much business is done in cattle; there are also two cattle fairs. The living of Bromley is a perpetual curacy in the diocese and archdeaconry of Rochester, and in the gift of the dean and chapter of the cathedral of that see: its clear yearly value is 160*l.* There were in Bromley, in 1833, two day and Sunday national-schools, one with 100 boys, and another with 90 girls; 15 children of each sex were clothed from an antient endowment. Bromley is one of the polling-places for the western division of the county of Kent.

Cranbrook, the principal town in the Weald of Kent, is in the hundred of Cranbrook in the lathe of Scray, 48 miles from London Bridge. The parish comprehends 10,460 acres, and had in 1831 a population of 3844, about half agricultural. The town of Cranbrook is irregularly built. The church is a large and handsome edifice in the perpendicular style, with good buttresses and fine windows; it is advantageously situated on a small eminence near the centre of the town. There are several dissenting meeting-houses. Cranbrook was once the centre of the clothing trade introduced by the Flemings, whom the policy of Edward III. induced to settle in this country. Since the removal of this branch of industry to the north and west of England, Cranbrook has been a mart for the agricultural produce of the neighbourhood, especially hops. The market, which is now held on Wednesday, is chiefly for corn and hops; every fortnight there is a cattle-market. The living is a vicarage in the diocese and archdeaconry of Canterbury, of the clear annual value of 163*l.*, with a glebe-house. There were, in 1833, eleven day-schools (two of them endowed) with 299 scholars; and six Sunday-schools with 449 children. In the parish of Cranbrook are the ruins of Sissinghurst, a fine mansion formerly the residence of the Baker family. From having been used as a French prison during one of the wars of the last century, it acquired the inappropriate name of Sissinghurst Castle. In the hamlet of Milkhouse Street, in this parish, are the remains of an antient chapel dedicated to the Holy Trinity. Cranbrook is one of the polling stations for the western division of the county.

Dartford is in the hundred of Axton, Dartford, and Wilmington, in the lathe of Sutton-at-Hone. It is on the river Darent, from which it gets its name (in Saxon Darentford, in Domesday Tarenteford), about three miles from its junction with the Thames, 15 miles from London Bridge on the road to Dover. The great insurrection under Wat Tyler, in the reign of Richard II., broke out here. The parish contains 4150 acres, and had, in 1831, a population of 4715, about one-tenth agricultural. The town is in a narrow valley, and the principal street is on the line of the Dover road. The church is near the east end of the town, close to the bridge over the Darent. The antient burying-ground is at some distance eastward from the church, on a hill which overlooks the town; a new burial-ground was consecrated a few years since. There are several dissenting places of worship. The trade of Dartford is considerable: there are chalk-pits near the town, and corn, oil, powder, and paper mills in the neighbourhood on the river Darent; also a large iron foundry and manufactory of machinery.

The first paper-mill erected in this country was at Dartford; it was built by Sir John Spielman, a German, who introduced the manufacture, and stood on the site of the present powder-mills: the first mill established in England for rolling and slitting iron was also near Dartford. Barges from the Thames come up to the wharf below the town. The market is on Saturday; and there is a yearly fair. The trade in corn is considerable. The living of Dartford is a vicarage in the diocese and archdeaconry of Rochester, of the clear yearly value of 534*l.* with a glebe-house. There were, in 1833, nine day-schools with 311 children; one of these, with 80 scholars, is endowed: there were two day and Sunday national schools with about 200 children; and three Sunday-schools with 166 children.

Near the town are the ruins of a nunnery, founded A.D. 1371, by Edward III., for Augustine nuns, but afterwards occupied by Dominican nuns. At the dissolution the prioress and several of the nuns were of some of the best and most antient families of the county: the revenues were then 400*l.* 8*s.* gross, or 380*l.* 9*s.* 0½*d.* clear. The buildings were occupied by Henry VIII., and, during her progress in Kent, by Queen Elizabeth, as a royal residence. The present remains are of brick and consist of a large embattled gate way, with some adjacent buildings, now occupied as a farm-house: the gardens and orchards occupied twelve acres, and were surrounded by a stone wall yet entire. There is an almshouse at Dartford, formerly an hospital for lepers.

Faversham is locally situate in the hundred of Faversham in the lathe of Scray, but has a separate jurisdiction, being a member of Dover, one of the Cinque-Ports. It is on a stream running into the East Swale, and just to the left of the road to Dover, 47 miles from London Bridge. It appears to have been a place of some note before the time of Stephen, who built and endowed here an abbey for Cluniac monks, in which himself, his queen Matilda, and his eldest son Eustace of Boulogne were buried. This abbey was at the time of the dissolution in the hands of the Benedictine order: its revenue was 355*l.* 15*s.* 2*d.* gross, or 286*l.* 12*s.* 6¾*d.* clear. Some portions of the outer walls remain. At the dissolution the remains of King Stephen were thrown into the river, for the sake of the leaden coffin in which they were contained.

The parish of Faversham comprehends 2270 acres, and had in 1831 a population of 4429, less than one-tenth agricultural. The population of the adjacent parish of Preston, a village which joins Faversham town, was at the same time 675. The town, which has been much improved in the last half century, consists principally of four streets forming an irregular cross, and having the guildhall and market-place in the centre. The church, which is a large cruciform structure of flint, has some portions in the decorated English style; other portions are of later date. There is a light tower at the west end, crowned with pinnacles, and surmounted by an octagonal spire. There are an assembly-room and a theatre. Faversham is a port, and has an excise-office and custom-house. The creek or arm of the Swale on which the town stands is navigable for vessels of 150 tons, several coasting vessels belong to the port. Coals from the North of England and timber from the Baltic are imported. The exports are chiefly agricultural produce, corn, hops, fruit, and wool, which are sent to London by hoys. There is no manufacture now except of gunpowder and cement on a small scale. The oyster fishery, which is an important branch of industry, employs about 250 adult males. The oyster fishermen and dredgermen form an incorporated company. The markets are on Wednesday and Saturday: there are a monthly cattle-market and an annual fair. The council of the borough of Faversham, under the Municipal Reform Act, consists of four aldermen or jurats and twelve councillors. The living is a vicarage in the diocese and archdeaconry of Canterbury, of the clear yearly value of 342*l.*, with a glebe-house. There were in 1833 a well endowed grammar-school, with 12 scholars; a national school with 185 children; and twenty-one other day-schools, with 640 children; two boarding-schools with 105 children; and three Sunday-schools with 452 children. There are several dissenting meeting-houses.

Folkestone is locally in the hundred of Folkestone in Shepway lathe, 70 miles from London, but has separate jurisdiction, being a member of the Cinque-Port of Dover. It was early a place of some importance: the Romans had a tower here on a high hill, of the earth-works or entrenchments of which there are yet some remains. By the Saxons it was called Folcestane; in Domesday, Fulchestan. There was a monastery, which had been destroyed by the Danes during or before the time of Athelstan. There was also a castle built by the Saxon kings of Kent, and rebuilt by the Normans, which has been in later times nearly all destroyed, with the cliff on which it stood, by the encroachments of the sea. All that remains is a small part of the wall near the church.

The parish of Folkestone comprehends in all 4360 acres, of which 680 are in the separate jurisdiction of the town: the population in 1831 consisted of 4296 persons, of whom 3638 were in the town. Folkestone is situated on the shore of the English Channel, partly in a hollow between two cliffs, and partly on the west cliff. The streets are narrow, steep, and indifferently paved. The harbour, owing to the accumulation of shingle, is not capable of affording anchorage to many vessels. Many boats belong to it, which are engaged in the mackerel and herring fisheries. The church,

which stands at the west end of the town, is a cross church of early English character, having a tower in the centre supported by strong piers. The western end was partly blown down by a hurricane in December, 1705, and when rebuilt the dimensions were contracted. There are three dissenting places of worship. There was a Benedictine priory at Folkestone, originally alien, but afterwards made denizen. A gateway in the wall and some part of the foundations are all that remain of this building. The trade of the town is dull: fishing and smuggling are both on the decline. The market is on Thursday, and there is one yearly fair. The council under the Municipal Reform Act consists of four aldermen or jurats and twelve councillors. The market-house and the guildhall have been lately rebuilt. The living is a perpetual curacy, in the diocese and archdeaconry of Canterbury, of the clear yearly value of 185*l*. There were, in 1833, one infant-school, with 60 children; twelve dame-schools, with 251 scholars; six day or boarding and day schools, with 242 children; and four Sunday-schools, with 491 children. Dr. William Harvey was born at Folkestone.

Folkestone was by the Reform Act made part of the parliamentary borough of Hythe.

The village of Sandgate, which is partly in Folkestone parish, is a place of some resort as a bathing-place. There is a castle at Sandgate, built by Henry VIII., probably on the site of a more antient one.

Gravesend is on the south bank of the Thames, locally in the hundred of Toltingtrough, in the lathe of Aylesford, 22 miles from London Bridge through Dartford. The western part of the town is in the parish of Gravesend, the eastern in that of Milton. In the time of Richard II. Gravesend was burned, and most of the inhabitants carried into captivity by a squadron of French galleys. In the reign of Henry VIII. two platforms were raised for the protection of the town, and a blockhouse at Tilbury, in Essex, to guard the passage of the river.

The parish of Gravesend comprehends 630 acres, with a population, in 1831, of 5097; Milton contains 650 acres, with a population of 4348: making together 1280 acres, with a population of 9445. Gravesend has of late years become a great place of resort for visitors from the metropolis, and has been much enlarged and improved: the old town is however still mean and irregular. Two piers have been erected for landing passengers, and a convenient bathing-house for visitors. There are a library, concert-room, theatre, and gardens. The country round Gravesend is pleasant, and the view from the Windmill Hill, above the town, extensive. The church, which is near the centre of the town, is a neat spacious brick building: there are a chapel of ease and several dissenting places of worship. Milton church is near the east end of the town.

Formerly vessels sailing from the port of London were obliged to stop at Gravesend to take their clearances. Outward-bound Indiamen still take in fresh provisions here: seamen going out provide themselves with slops. There are considerable lime-works and brick-fields about the town, and a great quantity of land in the neighbourhood is occupied by market-gardeners, who raise vegetables, especially asparagus, for the supply of the London markets. Many vessels are employed in fishing; and some rope-making and ship-building are carried on. The resort of visitors from the metropolis to Gravesend during the summer season is very great, owing to the cheapness of steam-boat conveyance and its convenient distance from London. The market is on Wednesday and Saturday, the former for corn. The canal which unites the Medway and the Thames enters the latter near Gravesend. This town is one of the polling-places for West Kent. There is a fort at Gravesend, mounting sixteen guns.

The living of Gravesend is a rectory, of the clear yearly value of 307*l*.; that of Milton a rectory, of the clear yearly value of 359*l*.; both of them are in the diocese and archdeaconry of Rochester.

The inhabitants of the parishes of Gravesend and Milton were incorporated by Queen Elizabeth. By the Municipal Reform Act the borough was divided into two wards: it has 6 jurats or aldermen and 18 councillors. There were, in 1833, in the two parishes, two infant or dame schools, with 74 children; two national schools, with 180 children; one endowed day-school, with 34 children; seventeen other day-schools, with 449 children; seven boarding-schools, with 165 children; and four Sunday-schools, with 559 children.

Lydd, or Lid, is in the hundred of Langport, in the lathe of Shepway. The hundred is one of those included in the liberty of Romney Marsh; but Lydd is a corporate town, and a member of the cinque-port of New Romney, from which it is distant about three miles. The name is written in antient records Hlyda, and is supposed to be a corruption of the Latin *littus*, 'a shore,' a name corresponding to its situation. It is upon the tongue of land, the termination of which is Denge Ness, about two miles from the sea; but it is probable that the sea once came nearer to it. The parish comprehends 11,660 acres, with a population, in 1831, of 1357, more than half of which was agricultural. The town consists of houses irregularly built on an open flat, and from its being quite out of any thoroughfare, and from the decline of the contraband trade, by which it was formerly supported, it is a dull decayed place. The church is a large building, with a fine tower in the perpendicular style, and crocketted pinnacles. The market is on Thursday: the chief employment of the townsmen is in fishing. The corporation, which is left untouched by the Municipal Reform Act, consists of a bailiff, jurats, and freemen. The bailiff and jurats are justices in the borough, which is co-extensive with the parish. The living is a vicarage, in the diocese of Canterbury, exempt from the archdeacon's visitation, of the clear yearly value of 1247*l*., with a glebe-house. There was, in 1833, only one school in the parish, a national school, of 116 children, with a lending library attached.

On the point of Denge Ness is a lighthouse 110 feet high, and a small fort. There is a spring of fresh water on this point, which is covered by the sea every tide.

Milton, sometimes distinguished as Milton-next-Sittingbourne, is in the hundred of Milton and in the lathe of Scray, on a creek or arm of the Swale, 39½ miles from London.

This town was a demesne of the Saxon kings, who are said to have had a palace in the neighbourhood. In the struggle of the Danish chieftain Hastings with Alfred the Great, the Danes formed an encampment here, the remains of which yet exist, under the name of Castle Rough, from its being overgrown with trees and underwood. The town was burned by Earl Godwin during his quarrel with Edward the Confessor, but rose to importance again in the time of the Conqueror. The parish comprehends 2340 acres, and had, in 1831, a population of 2233, of which about an eighth is agricultural. The town is on the side of a hill sloping down to the creek, and is ill built. The business of the place arises from its oyster fishery, and from its being the port of communication with London for the surrounding agricultural district. In the centre of the town is the antient court-house for holding the manor courts and public meetings, with the town gaol beneath. The market is on Saturday, and there is one yearly fair. Much corn is shipped here. The church, which is to the north of the town, is chiefly in the decorated English style; it is large and handsome, with an embattled tower at the west end. The living is a vicarage in the diocese and archdeaconry of Canterbury, of the clear yearly value of 256*l*. with a glebe-house.

There were in the parish, in 1833, seven infant or dame schools, containing 140 children; three day-schools, with 163 children; one day and Sunday national school, with 150 children, partly supported by endowment; and one Sunday-school, with 152 children.

Sevenoaks, in the hundred of Codsheath and the lathe of Sutton-at-Hone, is on the Hastings road, 24 miles from London. This town, called in an antient document Seovanacca, received its name from seven oak trees which once occupied the eminence on which the town stands. The parish comprehends an area of 6790 acres (of which 1910 are in the liberty of Riverhead, and 3210 in the Weald liberty), with a population of 4709; about one-third agricultural. The town is situated on the northern brow of the chalk marl and greensand range of high lands, in the midst of a fertile and well cultivated district. It is well built, and contains a number of good houses. The church is spacious and elegant, and, from its situation on an eminence, forms a conspicuous object; it is chiefly in the perpendicular style. There are several dissenting meeting-houses. At the south end of the town is the grammar-school, which has a good endowment: there is also a large range of almshouses; both these institutions owe their origin to Sir William de Sevenoke, a foundling brought up by some charitable persons in this town, from which he

took his name. There are two other well endowed schools, founded by Lady Margaret Boswell, with a handsome school-house lately rebuilt. The market-house is an old building, in which the county assizes were held frequently during the reign of Elizabeth and occasionally since. The market is on Saturday, chiefly for corn; there is a monthly cattle-market; and also two yearly fairs. There are some silk-mills in the neighbourhood. The living is a vicarage and sinecure rectory, in the peculiar jurisdiction of the archbishop of Canterbury, of the clear yearly value of 935*l.*, with a glebe-house.

Near Sevenoaks is Knowle Park, the seat of the Earl of Plymouth.

There were, in 1833, in Sir William de Sevenoke's grammar-school 31 boys (11 on the foundation); in Lady Boswell's schools, 215 children of both sexes; and in thirteen other day or boarding and day-schools, 408 children. There were four Sunday-schools, with 397 children, three of them with lending libraries attached.

Sittingbourne is in the hundred of Milton and the lathe of Scray, 40 miles from London on the road to Canterbury. The parish contains 1260 acres, and had, in 1831, a population of 2182, about one-eighth agricultural. It consists chiefly of one main street. There are some good inns, and the prosperity of the place depends in a great degree on the passage of travellers between London and Dover. The church is a spacious edifice, rebuilt, with the exception of the tower and the external walls, since A.D. 1762, when it was accidentally burnt. It has some curious windows of decorated character, and some fine ones of perpendicular date. Queen Elizabeth granted, in two successive charters, a weekly market and two fairs· she also incorporated the town, and granted the privilege of returning members to parliament. Communication with London is maintained by hoys from a quay on Milton creek in this parish. The weekly market has been long discontinued, the fairs remain, and the other privileges were never exercised. The present market is held monthly. The living is a vicarage in the diocese and archdeaconry of Canterbury, of the clear yearly value of 212*l.*, with a glebe-house. There were, in 1833, two dame-schools, with 29 children; nine boarding and day schools, with 186 children; one national school, with 160 children; and one Sunday-school, with 233 children. Sittingbourne is one of the polling-places for East Kent.

Tenterden is locally in the hundred of Tenterden and lathe of Scray, but has a separate jurisdiction, being a member of the cinque-port of Rye. It is 55 miles from London, on the road through the Weald of Kent to Romney. The parish comprehends 8620 acres, and had, in 1831, a population of 3177, about half agricultural. The town stands on an eminence, in a rich agricultural district, upon which it depends: it consists of one main street along the Romney road, and contains some good houses. The church is a spacious and handsome edifice, chiefly of perpendicular character, having a lofty tower at the west end, to which a beacon was formerly attached. It has been a popular saying that 'Tenderden steeple was the cause of Goodwin Sands.' This has been supposed to originate from the circumstance of the funds destined for keeping up Sandwich haven having been applied to the building of this church. There are some dissenting places of worship. There is a townhall, a modern building, sometimes used as an assembly-room. The market is on Friday, and there is a yearly fair. When the clothing trade was carried on in the Weald of Kent, this town was one of the manufacturing places. Tenterden was incorporated by Henry VI. The corporation, under the Municipal Reform Act, consists of 4 jurats or aldermen and 12 councillors. The living is a vicarage, in the diocese and archdeaconry of Canterbury, of the clear yearly value of 177*l.* There were, in 1833, a national school, with 190 children, endowed with the transferred funds of a decayed grammar-school; six other day-schools, with 127 children; and four Sunday-schools, with 181 children.

Tunbridge, or Tonbridge, is in the liberty of the Lowey of Tunbridge, and in the lathe of Aylesford, 30 miles from London, on the road to Hastings. In the time of the Conqueror a castle was built on this spot on the banks of the Medway by Richard Fitz-Gilbert (otherwise Richard de Tunbridge), afterwards earl of Clare; and the town rose under the protection of the castle. In the civil troubles of the reign of Henry III. the castle was besieged and taken from its owner Gilbert Rufus, earl of Clare, Glo'ster, and Hertford, by Prince Edward. During the siege the garrison burnt the town. There was also a priory at Tunbridge founded by Richard de Clare, first earl of Hertford, in the time of Henry I., for canons of St. Augustin, the revenue of which at the suppression was 169*l.* 10*s.* 3*d.* The parish comprehends 14,730 acres, and has a population of 10,380, about one-fourth agricultural. The town consists chiefly of one street, broad, partially paved, and, from its being on a declivity, clean. There are several bridges over the Medway, which is here divided into various arms. Near the principal bridge is a wharf, where the timber brought from the Weald is sent down the Medway. The church, which is near the centre of the town, is a large and handsome fabric, in various styles of architecture. There is a free-school, founded by Sir Andrew Judd, and richly endowed: it has 16 exhibitions of 100*l.* per annum each, tenable at any college of Oxford or Cambridge, besides thirteen other exhibitions, and a fellowship at St. John's College, Oxford. There are a townhall and market-house. The ruins of the castle, which are near one of the bridges, consist of an entrance gateway, flanked with round towers, and tolerably perfect, and of the artificial mound on which the keep stood; the outer walls enclosed an area of six acres. The ruins of the priory consist principally of the refectory, now converted into a barn. There is a weekly market on Friday, and a monthly cattle-market, also one yearly fair. The trade of the town is in coal and timber brought from Maidstone for the supply of the neighbourhood: gunpowder and wooden wares (which last take their name from the town) are made to a small extent. The living is a vicarage in the diocese and archdeaconry of Rochester, of the clear yearly value of 763*l.*, with a glebe-house.

There were in 1833 seven infant or dame schools, with 272 children; Judd's endowed grammar-school, with 100 boys (60 of them on the foundation); the 'Southborough Free-school,' with 57 children; and fourteen other boarding and day schools, with 430 or 440 children; four day and Sunday schools of the established church (two of them national schools), with 382 children, and three Sunday-schools with 420 children.

Tunbridge Wells is between five and six miles south of Tunbridge, upon the border of Kent and Sussex, part of it being in each county. It extends into the parishes of Speldhurst (Washlingstone hundred, lathe of Scray), and Frant (Rotherfield hundred, rape of Pevensey, Sussex), but is chiefly in that of Tunbridge. The population cannot be given distinct from that of the parishes in which the town is situated. The chalybeate spring, to which the town owes its origin, was first noticed in the reign of James I., by Dudley lord North, who had been residing in the neighbourhood for the recovery of his health. The benefit which he derived from the water brought the spring into notice; the wells were sunk, paved, and enclosed, but the visitors found accommodation at Tunbridge town. The water is chalybeate, and nearly equal in strength to that of Spa, in Germany. The soil is dry, and the air of the place is healthy, though cold. When Henrietta, queen of Charles I., visited the Wells, she and her suite remained under tents. By degrees however permanent habitations were erected in the immediate vicinity of the wells, and at the neighbouring villages of Southborough and Rusthall. After the Restoration the place rapidly increased. A chapel was built at Tunbridge Wells dedicated to King Charles the Martyr; a subscription-school was also established, and an assembly-room, coffee-house, bowling-greens, and other places of amusement were erected in the neighbourhood. The town has much increased of late years. The Wells, properly so called, are in the centre of the town, and near them are the markets, the chapel, the assembly-rooms, and the public walks, or parades. There are a theatre, libraries, and the other usual requisites of a watering-place. Different groups of houses are distinguished by the names of Mount Zion, Mount Ephraim, Mount Pleasant, and Bishop's Down. About a mile and a half south-west from the Wells, in the county of Sussex, are the High Rocks, which present a striking and romantic scene. The chapel at Tunbridge Wells has been enlarged since its first erection, and stands partly in each of the three parishes. There is a new church lately erected in Tunbridge parish, and there are some dissenting meeting-houses. Tunbridge Wells is famous for toys and small articles turned in holly, plum-tree, cherry-tree, sycamore, and various foreign woods.

Southborough is midway between Tunbridge town and

the Wells. A new district church has been erected here, and there is (as already noticed), an endowed free-school. The place consists of a number of scattered houses.

Westerham is in the hundred of Westerham, in the lathe of Sutton-at-Hone, 21 miles from London, through Bromley. It is near the source of the Darent, and in the valley of Holmesdale, between the chalk and the ragstone hills. The parish has an area of 5740 acres, and the population in 1831 was 1985, about two-fifths agricultural. The town is on a declivity; the principal street runs east and west on the road which runs from Maidstone along the valley of Holmesdale into Surrey. The church is a neat and tolerably spacious building, chiefly in the perpendicular style: it contains a neat cenotaph to the memory of General Wolfe. There are one or two dissenting places of worship. The market is on Wednesday, and there is a yearly cattle-fair.

The living is a vicarage united with the parochial chapelry of Edenbridge; they are in the diocese and archdeaconry of Rochester; their joint annual value is 608*l*., with a glebe-house. There were in 1833 a national school with 46 girls, and five other day-schools with 144 children; two boarding-schools with 45 children; and two Sunday-schools with 96 children.

General Wolfe and Bishop Hoadley were natives of Westerham.

Queenborough, or Quinborowe, is in the liberty of the Isle of Sheppey, in the lathe of Scray, 45½ miles from London, by a road branching from the Dover road eight miles beyond Chatham, and leading into the Isle by King's Ferry over the West Swale. Queenborough (antiently Cyningburg) belonged to the Saxon kings, who had a castle here, on the site of which Edward III. commenced a new and more extensive fortress. Edward made the town a free borough, and gave it the name of Queenborough, in honour of his consort Philippa. This castle was demolished in the time of the Commonwealth, but the moat and well point out its site. The well, after being partly filled up with rubbish, was cleared out and restored to use in 1725; it supplies the town with water. Queenborough is a poor place; the greater part of the inhabitants are dependent on the oyster fishery; a few of them possess boats of their own. The houses form one main street: the church was originally a chapel to the parish church of Minster, but is now parochial: the interior is neat. There is a guildhall and a small gaol under it. Queenborough has a corporation, and until disfranchised by the Reform Act it returned two members to parliament.

The parish had in 1831 a population of 786. The income of the corporation is derived from the oyster fishery, the management of which is in their hands. The markets, which are now disused, were held on Monday and Thursday. The living is a perpetual curacy in the diocese and archdeaconry of Canterbury, of the clear yearly value of 66*l*., with a glebe-house. There were in 1833 a free-school, with 72 children, five other day schools, with about 100 children, and two Sunday-schools, with 177 children.

St. Mary Cray, the most considerable of the villages which take their name from the river Cray (the others are St. Paul's Cray, Foot's Cray, and North Cray), in Ruxley hundred, Sutton-at-Hone lathe, is on a cross-road which connects the Maidstone and Hastings roads, 13 miles from London. It had formerly a market, but it was discontinued in 1703 in consequence of the market-house having been blown down. The population in 1831 was 905. Elham, or Eleham, is in Loningborough hundred, Shepway lathe, on the Lesser Stour. It was formerly a place of consequence, though now only a village. A market was granted by Henry III., and it is still held at intervals of five or six years in the market-house, which is yet standing, in order to maintain the charter. The church has a large tower of early English architecture, with a small leaden spire. Population in 1831, 1302. Eltham is in Blackheath hundred, Sutton-at-Hone lathe, eight miles from London on the Maidstone road. Here was a royal palace built at an early but unknown period. Henry III. kept Christmas here A.D. 1270. Most of the succeeding sovereigns frequently resided here till Henry VIII., but on the rise of Greenwich it was deserted. The principal part of the palace yet remaining is the antient hall, 100 feet long by 56 broad, and 60 high, now occupied as a barn or cow-house: the windows now bricked up have been extremely elegant: the roof is of timber curiously wrought and richly ornamented. The area of the palace is surrounded by a high stone wall, and a broad deep moat, now converted into a garden, over which are two bridges. Population in 1831, 2005, or including the hamlet of Mottingham, 2129. Goudhurst is partly in Marden and partly in Cranbrook hundred, in the lathe of Scray. The church, which is on a commanding eminence, is a spacious fabric, with a low massive western tower formerly crowned with a lofty spire. Goudhurst was formerly one of the clothing towns of the Weald, and had a weekly market. Population in 1831, 2758. Lenham is in Eyhorne hundred, in the lathe of Aylesford, on the road from Maidstone to Ashford and Folkestone. The market was discontinued early in the last century, and the attempts since made to revive it have failed. Population in 1831, 2197. Town Malling, otherwise West Malling, is in Larkfield hundred, lathe of Aylesford, 29 miles from London Bridge, just out of the Maidstone road. Here was an antient Benedictine nunnery, the yearly value of the possessions of which at the dissolution was 245*l*. 10*s*. 2½*d*. gross, or 218*l*. 4*s*. 2½*d*. clear. Many parts of the conventual buildings are yet standing, especially a portion of the west end of the church, a beautiful specimen of Norman architecture. There is also at St. Leonard's, a hamlet of Malling, a tower 71 feet high, much resembling the keep of a Norman castle; it belonged to St. Leonard's chapel, now destroyed. Town Malling church, a handsome and spacious building, has a Norman tower at the west end. There is a small endowed free-school. The market, held on Saturday, has not been long discontinued. Population in 1831, 1459. Smarden is in Calehill hundred, in the lathe of Scray, in the Weald. The market-house is yet standing. There are one or two dissenting meeting-houses and a small free-school. Population in 1831, 1177. Wrotham is in Wrotham hundred, in Aylesford lathe, 24 miles from London, on the Maidstone road. It lies near the foot of the chalk hills. The church is a large well-built edifice in a great mixture of styles. The market was held in the centre of the village at the intersection of the two principal streets. Population in 1831, 2601. Wye is in Wye hundred, in the lathe of Scray, about three miles north-east of Ashford under the chalk hills. Here was before the Reformation a college, the buildings of which, forming a quadrangle round an open court, are used for the purposes of two endowed schools. The market has been long discontinued. Population in 1831, 1639.

Besides the foregoing decayed market-towns, one or two villages claim notice. Lewisham in Blackheath hundred, in the lathe of Sutton-at-Hone, consists of a long street of good houses, extending about two miles along the Hastings road. There is a modern church near the centre of the town. There are a grammar-school and an English school, both endowed, and an almshouse. The chapelry of Sydenham is a part of Lewisham parish, which had in 1831 a population of 9659. Broadstairs on the coast, near the North Foreland, has risen into notice as a watering-place: it is in Ringslow or Thanet hundred, in St. Augustine lathe. A small pier for the protection of the fishing craft was antiently built here, and the passage down the cliff to the sea was defended by an arch, gates, and portcullis; the arch still remains. There are some remains of an antient chapel near the pier, which is now converted into a dwelling-house. There are many good houses at Broadstairs, with libraries, warm baths, and other accommodations. Many Roman coins have been found here. Minster, in the Isle of Thanet and Ringslow hundred, had an antient nunnery destroyed by the Danes. The church is antient, and chiefly of early English character: it is a cross church, with a tower at the west end. Minster in Sheppey (lathe of Scray), had also a very antient nunnery, whose yearly possessions at the dissolution were valued at 29*l*. 7*s*. 10¾*d*. gross. The gate-house and part of the church and chapel yet remain.

Whitstable, in Whitstable hundred, in the lathe of St. Augustine, on the æstuary of the Thames, is about six miles from Canterbury, with which city it communicates by a railroad. It may be considered as the port of Canterbury. Hoys convey goods to and from London, and colliers discharge their cargoes here. The inhabitants are engaged in the oyster fishery; in dredging for oysters round a rock called 'the Pudding-pan,' many pieces of Roman pottery have been found. Population in 1831, 1926. What is called Whitstable-street extends into Seasalter parish. A few miles east of Whitstable, on the æstuary of the Thames, is the new watering-place Herne Bay, which contains many good houses and several hotels; but the place has been laid out on

so extensive a scale that it will long have an unfinished appearance. There is a pier or jetty, built on wooden piles, extending three-quarters of a mile over the sand or ooze, which is left dry at low water. A handsome clock-tower stands near the jetty. Steam-boats ply between London and Herne Bay during the season. Herne church, which is about a mile from Herne Bay, has some good portions in the early English and perpendicular style. There is a chapel at Herne Bay.

Divisions for Ecclesiastical and Legal Purposes.—The county was formerly divided between the dioceses of Canterbury and Rochester. The part east of the Medway constituted the diocese and archdeaconry of Canterbury; it was subdivided into the eleven rural deaneries of Bridge, Canterbury, Charing, Dover, Eleham, Limne, Ospringe, Sandwich, Sittingbourne, Sutton, and Westbere, and comprehended, according to Hasted (A.D. 1778) two hundred and eighty-one parishes. The remaining part of the county, west of the Medway, constituted, for the most part, the diocese and archdeaconry of Rochester; it was subdivided into the three rural deanries of Dartford, Malling, and Rochester, and comprehended ninety-eight parishes. The deanery of Shoreham, west of the Medway, comprehending thirty-four parishes, was in the peculiar jurisdiction of the archbishop of Canterbury.

By the late act 6 & 7 Will. IV., c. 77, provision has been made for the alteration of these arrangements. The parishes of Charlton, Lee, Lewisham, Greenwich, Woolwich, Eltham, Plumstead, and St. Nicholas and St. Paul, Deptford, all hitherto in the deanery of Dartford, and diocese of Rochester, and in the neighbourhood of London, are to form part of the diocese of London: the city and deanery of Rochester are to remain part of the diocese of Rochester, to which diocese nearly the whole of Essex and the whole of Hertfordshire are added; the remainder of Kent is to form the diocese of Canterbury. The deancry of Rochester is to form an archdeaconry.

Kent is in the Home circuit, excepting certain parishes near London, namely, Charlton, Lee, Lewisham, Greenwich, Woolwich, Eltham, Plumstead, and St. Nicholas and St. Paul, Deptford, which are in the jurisdiction (in criminal matters) of the Central Criminal Court. The assizes are held at Maidstone, where are the county gaol and the house of correction. For subordinate jurisdictions the county is divided into East Kent and West Kent; the former comprehending the lathes of St. Augustine and Shepway, and the hundreds of Middleton or Milton, Teynham, Faversham, Boughton, Felborough, Wye, Calehill, and Chart and Longbridge, forming the upper or northern division of the lathe of Scray; the latter comprehending the lathes of Sutton-at-Hone and Aylesford, together with the hundreds of Marden, Cranbrook, Barclay, Blackbourne, Tenterden, Rolvenden, Barnfield (East), and Selbrittenden, which form the lower or southern division of the lathe of Scray. The justices of the peace, though by their commission appointed for the whole county, usually confine the exercise of their power to their own division of it, and separate quarter-sessions are held, for East Kent, at Canterbury, and by adjournment at Maidstone a day or two after, for West Kent.

The same two great divisions are, since the county was divided by the Reform Act, used for parliamentary purposes. East Kent returns two members; the election takes place at Canterbury, and the polling stations are Canterbury, Sittingbourne, Ashford, New Romney, and Ramsgate. West Kent also returns two members; the court for their election is held at Maidstone; and the polling stations are Maidstone, Blackheath, Bromley, Gravesend, Tunbridge, and Cranbrook. Two members each are returned for the cities of Canterbury and Rochester, for the Cinque-ports of Dover and Sandwich, and for the boroughs of Greenwich and Maidstone, and one member each for the Cinque-port of Hythe and the borough of Chatham. The total number now returned from the whole county is eighteen. Before the Reform Act it was the same, By that Act New Romney and Queenborough, returning two members each, were disfranchised, and Hythe reduced from two members to one, making a deduction of five members; but the loss was exactly compensated by the division of the county, and the creation of the new boroughs of Greenwich and Chatham.

History and Antiquities.—This county comprehends that part of England which from its proximity to the Continent first obtained distinct historical notice. The name is very antient, probably of Celtic original: its meaning has been inferred, from a comparison with other names which seem to include the same element (Cant-ire, Cant-abri, Cant-æ), to be 'corner' or 'projection,' a designation suitable enough to the position of this and of the other countries or nations mentioned.

Cæsar mentions the district by its name, which he gives in the Latinized form Cantium; he ascribes to the inhabitants civilization much superior to that of the other islanders. It was the part on which his attack was made in his first invasion, and he did not then pass beyond its limits: in his second invasion he passed through it to the assault of other tribes; some sharp encounters took place during his march in this county, and in his absence five of the reguli or petty princes of Cantium made an unsuccessful attempt to storm the fortified intrenchment which protected his fleet, B.C. 54. In the invasion under Aulus Plautius, A.D. 43, and in the subsequent wars with the Romans, there are no historical incidents the locality of which can be identified with Cantium, except the destruction of London by the insurgents under Boadicea. Ptolemy places Λονδίνιον (Londinium) among the towns of the Κάντιοι (Cantii, or people of Cantium); a statement which, if accurate, supposes the district to have exceeded the limits of the present county, whether we place the antient Londinium on the north or south side of the Thames; and which, if we place the original site of London on the north of the river, as it most likely was, supposes that some part of Middlesex must have been included in Cantium.

In the division of the Roman empire which prevailed in its later period Cantium was comprehended in the province of Britannia Prima (one of the four into which the diocese of Britain was divided), except that part of it (if any) which lay north of the Thames, which was in the province of Flavia Cæsariensis. Several important stations were within the limits of the modern county. There were the four harbours of Regulbium, Reculver; Ritupæ, or Ad Portum Ritupis, Richborough near Sandwich; Dubræ, or Ad Portum Dubris, Dover; and Lemanæ, or Ad Portum Lemanis, Lympne or Limme, near Hythe. Roads from these places met at Durovernum, or Canterbury; from whence the military way called Watling Street ran in a direct line to Londinium, London, passing by the way through Durolevum, Newington, or more probably Judde Hill near Ospringe; Durobrivæ or Durobrivis, Rochester; and Vagniacæ, Southfleet near Gravesend. The above places, with the exception of Regulbium, are mentioned in the 'Itinerary of Antoninus,' which also notices Noviomagus, Holwood Hill near the source of the Ravensbourne, which though placed in the Itinerary between Vagniacæ and Londinium, was out of the line of Watling Street. Regulbium is mentioned in the 'Notitia Imperii' and by Richard of Cirencester. Besides these there were other stations, as Madus, mentioned by Richard and noticed in the Peutinger table or map; and Anderida, a harbour mentioned both in the 'Notitia Imperii' and by Richard, but which is more likely to have been on the coast of Sussex. Besides Watling Street, and Stone Street, which runs from Canterbury to Lympne, there were probably several Roman roads in Kent which have not been distinguished by any particular name.

Of these stations and roads there are many remains. Regulbium, now Reculver, defended the northern entrance of the channel between Thanet and the rest of the county. The encroachments of the sea have washed away part of the station. The church of Reculver, which forms a well known sea-mark, occupies the centre of it. The enclosure was a square with the angles rounded off. Parts of the walls on the east, south, and west side yet remain: in their general structure they bear a close resemblance to those of Richborough Castle, but are in a much inferior state of preservation. The town is supposed to have been to the north of the station, on a site now undermined and washed away. Many Roman antiquities of various kinds have been discovered here, and imperial coins are still often found after heavy rains. Richborough Castle, near Sandwich, is the Ritupæ or Ad Portum Ritupis of the Romans. The name of this place is variously spelt. It is called Ad Portum Ritupis in Antoninus; 'Ρουτούπιαι by Ptolemy; Rhutupis by Richard of Cirencester, who terms it a colony; and Ratupis in the Peutinger table. Ritupæ is the presumed nominative of Ritupis, as Dubræ of Dubris. and

Lemanæ of Lemanis. Richborough is one of the noblest Roman remains in the island. It was the usual place of communication with the Continent, and guarded one mouth of the channel which then insulated Thanet. It stands on a small elevation, along the base of which the Stour flows, and about one mile in a direct line from its entrance into Pegwell Bay. The walls form a parallelogram, but the east wall has disappeared and probably fallen into the Stour. The area within the walls is five acres. The walls are flanked by projecting round towers at the angles, and by intermediate round towers. There is a large opening in the west wall, and a narrower one, the Porta Decumana, in the north wall. The foundations of the walls are laid with great care; and the walls were built of blocks of chalk and stone, and faced on both sides with squared blocks of Portland or grit-stone, banded at intervals with double rows of large flat tiles. The walls to the height of six feet are eleven feet three inches thick, above that height they are ten feet eight inches. The top of the wall is everywhere imperfect; its greatest height is twenty-three feet. A quarter of a mile from the south-west angle of the castle are the remains of a Roman circular amphitheatre of about seventy yards diameter. Coins and other antiquities have been dug up here. In the circuit of Dover Castle are the ruins of a pharos or watch-tower, an indubitable relic of the Roman Dubræ. This watch-tower has an octangular base externally, but within it is a square: the height, when Stukeley examined it, was about forty feet, but the upper part is an addition or repair of a later period. The foundations were laid in a bed of clay, though it is built on a chalk rock. The structure is composed of long, thin, irregular bricks, with intermediate courses formed by blocks of hard stalactitical incrustations: it is now in a very dilapidated state. The ruin of an old church adjoining the pharos is not Roman, but Roman bricks have been worked up in it.

At Lymne, or Lympne, near Hythe, are the remains of the Roman fortress Lemanæ, or Ad Portum Lemanis. This fort, now called Stutfall Castle, had an area of about five acres. Stukeley and Leland have much exaggerated it; the walls are imperfect, and have been overthrown in some places by the subsidence of the soil, which here forms a steep hill or cliff on the edge of Romney Marsh. The river Limene or Rother formerly had its course under this hill and formed the harbour. Richard spells the name of this place Lemanus.

At Durovernum (Canterbury) numerous antiquities have been discovered, and until towards the end of the last century three semicircular arches of Roman bricks were standing in different parts. Many Roman bricks have been worked up into the city walls. Richard gives to Durovernum the name Cantiopolis. At Durobrivæ (Rochester) various antiquities have been found, and Roman bricks have been worked up in the ruined walls of the cathedral precinct. The name of this place is said to have been corrupted in the later period of the empire into Roibis (Roibæ), or, in the Peutinger table, Raribis (Raribæ). From Roibis or Roibæ appears to have been formed the Saxon Hrof-Ceastre and the modern Rochester. Bede however derives Hrof-Ceastre from one Hrof, a Saxon chieftain. To Durolevum two positions have been assigned: at Newington there are the remains of entrenchments, and an abundance of Roman pottery has been dug up; on Judde Hill, in the parish of Ospringe, south of the Canterbury road, which agrees better with the distances of the Itinerary, are the remains of a square camp with the corners rounded off. Roman coins and fragments of culinary vessels, intermixed with many parcels of oyster shells, have been found; and in the ruins of Stone Chapel, just on the other side of the road, Roman bricks have been worked up, and in one place a separate piece of a Roman wall has been built in. At Southfleet, the Roman Vagniacæ, a large earthern vessel and a stone tomb containing several funeral antiquities were discovered early in the present century. On Holwood Hill, near Farnborough, on the Hastings road, the antient Noviomagus there are the remains of an immense elliptical encampment, in which Roman bricks and tiles have been turned up by the plough, and Roman coins picked up. Noviomagus, is said by Richard to have been the metropolis of the Bibroci. To the Madus of Richard (perhaps it should be Ad Madum) it is difficult to assign a position which will accord with the distances given by him. The name would lead us to Maidstone, or some post, or ferry, or ford, on the Medway, but the dis[illegible] as they stand will not admit of this Some identify the place with Durobrivæ or Rochester, but the numbers will not agree with this supposition. It may be mentioned here, that the numbers in Richard's Itinerary (Durolevo.. Mado XII. Vagnaca XVIII.), if transposed, would sufficiently well suit the distance of Maidstone from Judde Hill and Southfleet respectively, if we suppose a branch road from the Watling Street at Newington to Maidstone, and another road direct from Maidstone to Watling Street at Southfleet. The remains of an entrenchment at Newenden, the discovery of some Roman coins, and a tradition, mentioned by Camden, that a very antient town and harbour had existed here, have led some to fix on this as the site of Anderida. But the distance from Ad Portum Lemanis in Richard, and the declaration of Gildas, that it was in 'littore oceani ad meridiem,' would lead us to some position on the Sussex coast as the site of that town.

Of the Roman roads, the Watling Street, which nearly coincided with the present road from London to Canterbury, may be traced in several places. Dr. Plot observed traces of it on or near Blackheath. It is still visible on Bexley Heath, and again just beyond Dartford, where the modern road bends to the left towards Gravesend, while the Street pursues a direct course through Southfleet to Rochester. From hence to Canterbury the antient and modern roads coincide, and the traces of the antient one appear to have been, except in a few places, obliterated. The branch of Watling Street which led from Durovernum (Canterbury) to Lemanæ (Lympne), is still conspicuous for some miles. It pursues a straight course between the two places, and is known by the name of Stone Street.

The North Foreland is mentioned by Ptolemy under the name of Κάντιον or Ἀκάντιον ἄκρον, the promontory Cantium or Acantium. The Medway, the Stour, the small stream which enters the sea at Dover, and the Rother, appear to be mentioned in Richard under the respective names of Madus, Sturius, Dubris, and Lemanus. Thanet appears in the pages of Richard under the name of Thanatos, and the channel which insulates it, under that of Wantsuam. Cauna, which appears in Richard's map, is probably Canvey Island on the Essex shore; but its position more nearly resembles that of Sheppey.

In the Saxon invasion Cantium was the scene of many interesting events. The brothers Hengist and Horsa landed in Pegwell Bay, near Ipwines Fleet, now Ebb Fleet, in Thanet, probably about A.D. 446 or 449. Their force consisted of three ships, and perhaps three hundred men; and it is uncertain if their arrival was accidental, or whether they premeditated an incursion for the sake of plunder. One of the island princes, Wyrtgeorn or Gwrtheyrn (popularly Vortigern), engaged them to support him against the invasions of the Scots, whom they repelled. The names of Hengist and Horsa are poetical names (both in the Anglo-Saxon denoting a horse); and their exploits are, if not entirely fabulous, of so doubtful a character as to deserve little credit. Having received a grant of the Isle of Thanet, then insulated by a channel of some width, they received accessions of strength from their countrymen at home, and were soon involved in hostilities with the Britons. Thanet was called by the Britons Ruim or Ruym.

Of the early battles of Hengist and his Jutes with the Britons, the principal were fought in the year 455; the first on the Dereuent (Darent); the second at Epsford or Eglesford (Aylesford) on the Medway, in which battle the British prince Catigern, son of Vortigern, and the Saxon Horsa, fell; and the third at Stonar, near Sandwich. The localities indicate that at the commencement of the struggle the Jutes had advanced some way into the island, and that they were gradually repelled. The antient chronicles distinctly assign the victory in the second and third engagements to the Britons, who were led by Guortemir, popularly called Vortimer, son of Vortigern; after the battle of Stonar, the Jutes fled to their ships, and did not return to England till Vortimer's death, two years after. In A.D. 457, Hengist and his son Eric or Æsc, are said to have defeated the Britons with great slaughter at Creccanford (Crayford), the position of which indicates the advance of the Jutes; yet that advance was probably only for plunder, as the next recorded engagement, eight years after, A.D. 465, was at Wyppedes-fleot in Thanet. In A.D. 473, the Jutes obtained another victory at a place not named. Hengist died some years after (A.D. 488), leaving a reputation out of all proportion to the real extent of his achievements. The ravages of others seem to have been ascribed to him, and his pre-eminence

has probably resulted from his priority in point of time rather than from the wider extent or greater destructiveness of his devastations. Even their priority in point of time is questionable; for it has been supposed that during the decline of the Roman power the east coast, or the Saxon shore, had been to a considerable extent colonized by Saxons. Hengist's dominions never extended beyond Kent, and it may be questioned if he ever took the title of king. His son Æsc did; and was honoured as the real founder of the Kentish dynasty of the Æscingas, or sons of the ash-tree. Kent was called by the Saxons Cantwaraland: Durovernum became Cantwarabyrig or Cantwaraburh, whence Canterbury. In a Latin charter of Ethelbert, Kent is Cantia, and Canterbury Dorobernia.

Æsc was succeeded by Ocha or Octa, and Ermeric, whose genealogy and the period of whose reigns are obscure. Kent passed unnoticed in the more exciting events which occurred in other parts. But Oedilberct (Bede) or Aethelbyrht, or in Latin Ethelbertus, popularly Ethelbert, who succeeded Ermeric, was of a more aspiring disposition than his predecessors. In the year 568, being only sixteen years of age, he claimed the supremacy of the Anglo-Saxon princes, and invading the dominion of Ceawlin, king of Wessex, the most powerful of them, was defeated by that prince and his brother Cutha, or Cutholf, at Wibbandune (perhaps Wimbledon in Surrey). In A.D. 589 or thereabout, Ethelbert obtained the supreme power or dignity of Bretwalda, which he retained till his death A.D. 616. After the conversion of Ethelbert to Christianity, a church was built by Augustin, adjacent to the royal palace, which was the precursor of the present cathedral of Canterbury, which, from the political supremacy of Ethelbert and his earlier conversion, became the ecclesiastical metropolis of England. [ETHELBERT.]

Under Eadbald, son and successor of Ethelbert, the crown of Kent lost the supremacy which the talent or power of Ethelbert had acquired. A succession of obscure princes followed: Erconbert, A.D. 640; Ecgbryht, or Egbert, A.D. 664; Hlothere, or Lothar, A.D. 673,—in the reign of this prince Ethelred, king of Mercia, invaded Kent, put Hlothere to flight, and destroyed Rochester, A.D. 676; Eadric (A.D. 685) had previously reigned for some time in conjunction with Hlothere, with whom he was competitor for the royal power, which he compelled him to divide. In this reign, A.D. 686 and 687, Ceadwalla, king of Wessex, and his brother Mollo, or Wolf, attacked and ravaged Kent with extreme ferocity. Mollo was surprised by the Kentish men, driven into a hut, and burnt with twelve followers. Ceadwalla however established his supremacy over the kingdom of Kent, and held it till his abdication, A.D. 688. Wihtred and Swaebhard or Waebhard, were kings of Kent about A.D. 690 and 693: the former reigned for more than thirty years. He paid a heavy fine to Ina of Wessex, who had invaded Kent, as an expiation for the death of Mollo. Ethelbert, Eadbert, and Alric, brothers, reigned in conjunction under the supremacy of Mercia, A.D. 725. Alric was the survivor of the three, and in him ended the line of the Æscingas.

In A.D. 752, Kent was subject to Mercia, for Kentish men formed part of the army of Ethelbald, the Mercian king, in his war against Cuthred of Wessex. In the following half century Kent appears to have been in an unsettled state, and was perhaps divided between two or more petty princes: among whom Alchmund, Eadmund, or Eanmund, father of Egbert, afterwards king of Wessex, may be numbered. During part, if not the whole of this period, Kent was in subjection to Mercia, having been conquered by Offa, who defeated the Kentish men, A.D. 776, at Ottford. About A.D. 796 or 797, Eadbert, or Ethelbert Pren, king of Kent, was attacked by Cenwulf of Mercia; and having been seized by some of his own subjects 'the Merscwara,' or men of Romney Marsh, was by them cruelly mutilated and delivered up to the Mercians. Cenwulf bestowed the crown of Kent on his brother Cuthred, as subordinate prince; but on his death resumed the direct government of it. Other princes subordinate to Mercia were however soon appointed, of whom Baldred was one. Wessex was now establishing its supremacy over the other Anglo-Saxon kingdoms. Egbert, king of the West Saxons, having defeated the Mercians at Ellandun or Wilton, A.D. 823, dispatched a force into Kent under his son Ethelwulf, the Ealdorman or Alderman Wulfheard, and Alstan, bishop of Sherbourn. Baldred fled at their approach; and Kent passed from under the Mercian supremacy to that of the West Saxons, under which it long remained.

From this time Kent, with which Surrey and Sussex, and probably Essex, were incorporated, became a subordinate part of the West Saxon empire. It commonly formed the appanage of the eldest son, or heir apparent, of the king of Wessex, and when the heir succeeded to the paramount sovereignty he usually resigned the Kentish crown to his heir. Thus Ethelwulf, son of Egbert, was, during his father's reign over Wessex, king of Kent; and when he succeeded to the throne of Wessex, he bestowed Kent successively on his sons Athelstane and Ethelbert; the latter of whom retained the crown when his brother Ethelbald ruled over Wessex, and, on the death of Ethelbald, united Kent and Wessex under one sceptre. It is to be observed that after the death of Athelstan, Ethelwulf united for awhile the direct administration of the sovereignties of Kent and Mercia in his own person; and afterwards reigned in Kent in conjunction with Ethelbert, who was subordinate to him. In a grant, Ethelwulf takes the title of 'Rex Occidentalium Saxonum necnon et Cantuariorum.' During the reign of Ethelwulf in Wessex, and of his sons in Kent, the latter kingdom was repeatedly attacked by the Danes: Canterbury and Rochester were sacked by them. Athelstan, king of Kent, and the alderman Elchere, or Ealhere, however defeated the Danes at Sandwich, and took many of their ships. At a subsequent period the Danes landed in the Isle of Thanet, and vanquished the men of Kent and Surrey.

In the warfare of Alfred the Great with Hastings the Northman, Kent was again the scene of conflict. In the year 893 a fleet of two hundred and fifty vessels arrived on the coast, and the crews having landed in Romney Marsh, and built a fort at Apuldre, now Appledore, on the Rother, marched inland to ravage the country. Hastings himself with eighty vessels arrived in the East Swale, landed at Milton, and threw up a strong intrenchment near Sittingbourne. Alfred marched an army into Kent, and encamped between the two divisions of Hastings, which he thus kept in check: but the Northmen, by a rapid march, passed his army and penetrated into Surrey. Their subsequent hostilities and ravages, though widely spread, do not appear to have touched Kent.

From this time the crown of Kent was never separated from that of Wessex. The 'Juti Cantiani,' Jutes of Kent, are mentioned by an antient chronicler as subdued by Edward the Elder in the very commencement of his reign: they perhaps at first supported the claim of his cousin and competitor Ethelwold, though in a subsequent part of the struggle they supported Edward. In the next reign, that of Athelstan, Kent possessed its separate legislature, which regulated the terms on which the laws of Wessex should be accepted. Traces of the distinct laws and franchises of Kent continued however till long afterwards.

In the reign of Ethelred (A.D. 980, 991) when the Northmen renewed their ravages, Kent was subjected to their fury until they were bought off by Ethelred. In A.D. 993 they appeared with a fleet off Sandwich, which they plundered. In the following year they ravaged Kent and other parts until again bought off by the king. In the year 998 they entered the Medway, took Rochester, and plundered the western part of the county. In A.D. 1006 Sandwich was plundered by Sweyn, king of Denmark, who retired on the approach of Ethelred into the Isle of Thanet; and he soon after received a large sum from Ethelred as the price of his retreat. In A.D. 1008 a large Saxon fleet had its rendezvous at Sandwich, but performed nothing; and the next year the Danes landed in the Isle of Thanet, and being joined by their countrymen from other parts, besieged Canterbury, from the inhabitants of which they extorted a large sum as the price of their retreat. In subsequent years they renewed their ravages in Kent, took Canterbury by treachery, plundered it, and reduced it to ashes. In the short but fierce struggle between Canute and Edmund Ironside, Kent was again the scene of contest. Edmund defeated his rival at Otford, in 1016, and drove him to the Isle of Sheppey.

In the reign of Edward the Confessor Kent was included in the earldom of the famous Godwin, but it does not appear that he took his title from it, but from his more important earldom of Wessex. The earldoms of that day were not mere titles, but conveyed viceregal power over the districts confided to the earl.

At the great battle of Hastings the men of Kent formed the vanguard of the Anglo-Saxon army: it was their privi-

lage to occupy that post. A detachment of the Norman force having landed at Romney just before the battle, were defeated by the townsmen, which led William, when after the battle he marched along the coast, in order to secure the ports which communicated with the Continent, to burn that town and massacre the inhabitants. Having secured Dover Castle after a slight resistance, hung the governor, and burnt the town, he marched toward London by Watling Street; and in his way conciliated the favour, or at least disarmed the resistance, of the men of Kent, by granting them the continuance of their privileges. An unsuccessful attempt was subsequently made, A.D. 1067, by the Kentishmen, aided by the Earl of Boulogne, to surprise Dover Castle. In the reign of William Rufus, Kent was the scene of civil war: Odo, bishop of Bayeux and earl of Kent, raised the county in favour of Robert duke of Normandy. Rochester town and castle were defended on behalf of Odo, to whom the castle belonged, by Eustace earl of Boulogne, and the besieged did not capitulate till after a siege of many weeks. King John, when threatened with an invasion by Philippe II. Auguste of France, encamped with an army of 60,000 men on Barham Downs; but his courage failed him, and he made his memorable submission and surrender of his crown to Pandulphus, the Pope's Legate, at Dover. In the subsequent troubles, A.D. 1215, John collected an army of mercenaries at Dover, and marched inland; but William de Albini bravely defended Rochester Castle for three months against him, at which he was so enraged that on the surrender of the castle he ordered all the common soldiers, except the cross-bowmen, to be hung. In A.D. 1216, Louis, dauphin of France, landed in the Isle of Thanet, near Sandwich, in order to assist the barons, and took the castle of Rochester after a short siege; but after his retreat and the death of John, it again submitted to the crown. The rest of Kent submitted for a time to Louis, except Dover Castle, which was all along defended for the king against the Dauphin and the barons by Hubert de Burgh. In the troubles of the succeeding reign Rochester Castle was defended for the king against Simon de Montfort, who besieged it in vain.

It was in Kent that the rebellion of Wat Tyler broke out. The commons in this county and in Essex rose in a body, A.D. 1381. They attacked the archbishop of Canterbury's house at Maidstone, and released John Balle, a priest, who had been imprisoned for teaching doctrines like those of Wickliffe. The issue of the rebellion is well known. In the reign of Henry VI. the insurrection of Jack Cade broke out in Kent, A.D. 1450. [CADE.]

At the outbreak of the war of the Roses, A.D. 1451, Richard duke of York encamped near Dartford, where he fortified himself. The king, Henry VI., encamped on Blackheath. Some years afterwards, A.D. 1460, the navy which the duke of Somerset had collected at Sandwich was surprised and captured by an expedition from Calais, then in the power of the Yorkists. The earl of Warwick soon after landed at Sandwich and marched to London, being joined on his way by nearly 40,000 men. The bastard of Falconbridge, a Lancastrian, after his unsuccessful attempt on London, A.D. 1471, encamped on Blackheath, whence he slowly retreated through Kent to Sandwich, where he had a fleet: he submitted however to Edward IV., and surrendered his fleet and the town.

In the reign of Queen Mary, Kent was the scene of rebellion under Sir Thomas Wyatt, A.D. 1554. In the civil war of Charles I. and the Parliament, a severe battle was fought at Maidstone, A.D. 1648, in which the Parliamentarians, under Fairfax, obtained a complete victory.

In the reign of Elizabeth the river Medway appears to have formed the only harbour for the royal navy, then in its infancy. The dock at Chatham was built by that queen; and she erected Upnor Castle, on the opposite side of the Medway, to defend the passage of the river. In the reign of Charles II., A.D. 1667, a detachment from the Dutch fleet under De Ruyter sailed up the Medway as far as Upnor Castle. [CHATHAM.]

Of ancient castellated edifices, not already noticed or referred to, the most remarkable are Leeds, Hever, Chelham, Allington and Westerhanger castles, to which may be added the castellated mansions of Penshurst and Knowle. Leeds Castle is to the right of the road from Maidstone to Ashford, four or five miles from Maidstone. It is surrounded by a broad moat: the entrance is by a stone bridge of two pointed arches, and through a deep gateway in good preservation. Another gateway, which defended the entrance of the bridge, is in ruins. Part of the building has been modernized: the foundations of the more antient part, which formed the keep, rise immediately from the water, and are very strong. Leeds Castle was the residence occasionally of Richard II. and Henry IV. Hever Castle, on the Eden, one of the upper waters of the Medway, was erected in the time of Edward III., and possesses some historical interest as the residence of the Boleyn family. Here Henry VIII. used to visit Ann Boleyn in the days of their courtship. The castle is surrounded by a moat: the entrance gateway is flanked by round towers; the inner buildings form a quadrangle enclosing a court. Chilham Castle, about midway between Canterbury and Ashford, occupies a site on which there was probably a Roman building. After the Conquest a Norman castle was built here, of which the keep is the only part in good preservation. It is an irregular octagon of three stories, with walls ten or twelve feet thick, built of flint, chalk, and stone intermingled, faced with squared stone, and now mantled with ivy. The interior has been much altered and damaged: the view from the platform is very fine. The remains of Allington Castle, on the left bank of the Medway just below Maidstone, are occupied as two tenements. Allington was the seat of Sir Thomas Wyatt, an accomplished scholar of the time of Henry VIII., and of his son Sir Thomas, who suffered for treason against Queen Mary. Of Westerhanger, or Westonhanger, near Hythe, the principal remains are the outer walls, with the towers of the north and east sides, and a small chapel. Penshurst Castle is a very extensive pile. It is one of those castellated dwellings that immediately succeeded the baronial castles of a more troubled period. The principal buildings form a quadrangle enclosing a spacious court, and comprehending a hall, chapel, and other apartments. It derives its chief interest from having been the residence of the Sydney family. Knowle, or Knole, near Sevenoaks, the residence of the Sackvilles, dukes of Dorset, is another extensive and magnificent mansion: the principal buildings form a spacious quadrangle, and are in the castellated style. The greater part is of the fifteenth century, but some portions of it are yet older. There are earthworks, remains of castles, at Cowling, near the mouth of the Thames; at Thurnham, on the brow of the chalk hills near Maidstone, and one or two other places. Sandown, Sandgate, and Walmer Castles, all on the coast, hold a middle place between antient and modern fortifications. They are coeval with Deal Castle, and are of the time of Henry VIII.

Of monastic remains the principal are St. Augustine's Abbey [CANTERBURY], Aylesford Priory [AYLESFORD], and St. Radigund's Abbey, near Dover, which was founded about A.D. 1191, for Premonstratensian canons: its yearly revenue at the dissolution was 142*l.* 8*s.* 9*d.* gross, or 98*l.* 9*s.* 2½*d.* clear. The walls of the outbuildings, gardens, &c., cover a considerable extent of ground, and the whole appears to have been surrounded by a semicircular rampart and ditch. The walls of the entrance gateway are nearly entire; the north and west sides of the chapel, and part of the dwelling, now patched up as a farm-house, are also standing. The walls are generally covered with ivy. There are considerable remains of the Benedictine priory at Dover, including the gateway and refectory, both nearly entire. The abbeys of Faversham and Malling, and the priories of Tunbridge and Folkestone, have been already noticed. Of Boxley Abbey, near Maidstone, there are few remains; and the abbey buildings at West Langdon, not far from Dover, have been new fronted with brick and much altered. There are some remains of the priories of Bilsington, on the edge of Romney Marsh, and of Monks Horton, near Stone Street causeway, of which last the western entrance to the church is a small but beautiful ruin of late Norman architecture, with insertions of windows and doors of perpendicular character. The chapel of St. Nicholas's Hospital at Harbledown, near Canterbury, is partly of Norman and partly of later architecture.

Of the churches of the county the most worthy of note are its two cathedrals [CANTERBURY; ROCHESTER]. For antiquity Barfreston, or Barston Church, between Canterbury and Dover, but not on the high road, is most deserving of notice. This has been considered to be of Anglo-Saxon architecture, but is more probably Norman. It consists of a nave and chancel, having a joint length of 43 feet 4 inches; the width of the nave, 16 feet 6 inches; of the chancel, 13

feet 6 inches, interior dimensions. The nave and chancel communicate by an arch rising from wreathed columns and richly sculptured. There have been some insertions, but on the whole the church is much in its original state. Several other churches, including St. Mary's at Dover, are chiefly valuable for their Norman features; but the predominant character in the churches of the county is the early English.

(*Ordnance Map;* Greenough's and Walker's *Geological Maps;* Hasted's *History of Kent; Beauties of England and Wales;* Palgrave's *Rise of the English Commonwealth;* Sharon Turner's *History of the Anglo-Saxons;* Rickman's *Gothic Architecture;* Batteley's *Antiquitates Rutupinæ.*)

Statistics.

Population.—The inhabitants of Kent are principally engaged in agricultural pursuits. The government establishments at Chatham, Deptford, and Woolwich give employment to numerous artisans and labourers; but out of 155,655 males, twenty years of age and upwards, living at the enumeration of 1831, only 476 were returned as employed in manufactures or in making manufacturing machinery. Of these 164 were employed in calico-printing at Crayford and Bexley, 88 in weaving bagging at Maidstone, and the remaining 224 were employed as millwrights and in chemical works at Deptford and Greenwich, in the gunpowder-mills at Dartford, and in the making of Tonbridge-ware. Compared with the other counties of England the proportion of persons engaged in agriculture in Kent has been increasing. Under this aspect it stood thirty-third on the list in 1811, it was the twenty-eighth in 1821, and in 1831 it ranked the twenty-fifth. The actual proportions at each of the three periods here mentioned were—

	1811.	1821.	1831.
Families employed in Agriculture . . .	35·5	35·9	32·6
" Trade, Handicraft, &c. .	36·7	35·1	30·3
Other classes	27·8	29·	37·1
	100·	100·	100·

The population of Kent at each of the four enumerations made during the present century was—

	Males.	Females.	Total.	Increase per cent.
1801	151,374	156,250	307,624	..
1811	183,500	189,595	373,095	21·28
1821	209,833	216,183	426,016	14·18
1831	234,572	244,583	479,155	12·47

showing an increase between the first and last periods of 171,531, or 55⅘ per cent., which is very nearly equal to the whole rate of increase in England and Wales during that interval.

The following table gives a summary of the population of every hundred, &c., in the county, as found at the census of 1831:—

Summary of the County of Kent.

LATHES, CITIES, OR BOROUGHS.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
St. Augustine (Lathe) . .	13,254	14,999	122	619	5,612	4,086	5,301	36,395	38,519	74,914	17,654
Aylesford (Lathe) . .	15,442	18,081	221	440	8,448	4,837	4,796	45,859	45,609	91,468	22,731
Scray	12,957	15,293	63	339	7,879	4,205	3,209	39,785	39,188	78,973	19,108
Shepway	4,267	5,052	22	211	2,516	1,353	1,183	12,898	12,951	25,849	6,216
Sutton-at-Hone . .	12,728	14,659	172	519	5,985	3,811	4,863	36,137	37,805	73,942	18,305
Canterbury (City) . .	2,661	3,033	5	173	349	1,736	948	6,212	7,437	13,649	3,189
Chatham (Town) and Rochester (City) . . .	4,578	5,686	49	301	304	2,724	2,658	13,064	14,257	27,321	5,690
Deptford and Greenwich (Towns) . . .	8,051	9,689	113	765	184	2,700	6,805	22,007	22,341	44,348	12,281
Dover (Town and Port) .	2,095	2,551	26	56	37	989	1,525	5,303	6,619	11,922	2,823
Maidstone (Borough) . .	2,844	3,034	31	143	233	1,499	1,302	7,295	8,092	15,387	3,464
Sandwich (Town and Port) .	595	722	..	33	90	271	361	1,439	1,697	3,136	750
Woolwich (Town) . .	2,672	4,343	18	219	30	1,208	3,105	7,593	10,068	17,661	3,444
Militia under training . .	..	..	..	..	..	..	..	585	..	585	..
Totals . . .	82,144	97,142	842	3,818	31,667	29,419	36,056	234,572	244,583	479,155	155,655

County Expenses, Crime, &c.—The sums expended for relief of the poor at each of the four dates when the census was taken were—

	£.		s.	d.	
1801 . .	206,508,	being	13	5	for each inhabitant.
1811 . .	317,990	"	17	0	"
1821 . .	370,711	"	17	4	"
1831 . .	345,512	"	14	5	"

The sum expended for the same purpose in the year ending 25th March, 1837, was 185,503*l.*; and assuming that the population has increased since 1831 at the same rate of progression as in the ten preceding years, this sum gives an average of 6*s.* 10½*d.* for each inhabitant. These averages are all above the general averages for the whole of England and Wales.

The sum raised in Kent for poor-rate, county-rate, and other local purposes, in the year ending 25th March, 1838, was 433,274*l.* 16*s.*, and was levied upon various descriptions of property as under:—

On land . .	£275,810	11*s.*
Dwelling-houses .	140,513	8
Mills, factories, &c. .	12,510	17
Manorial profits, navigation, &c.	4,440	0
	433,274	16

The expenditure in the same year was—

For the relief of the poor . .	£369,587	13
In suits of law, removal of paupers, &c.	16,011	5
For other purposes . .	64,752	16
	450,351	14

The returns made up during subsequent years do not specify the proportions in which different descriptions of property were assessed. In the four years ending with 25th March, 1837, there were raised for local purposes—

1834 . . .	£418,785	13*s.*
1835 . . .	370,718	19
1836 . . .	313,669	7
1837 . . .	215,499	0

The expenditure for each of these years was as follows:—

	1834. £.	s.	1835. £.	s.	1836. £.	s.	1837. £.
For the relief of the poor .	343,878	9	297,098	6	247,929	12	185,503
In suits of law, removals, &c.	15,339	11	12,371	3	9,383	16	6 206
Payments towards the county-rate . .	65,439	14	24,790	2	22,933	12	..
For all other purposes			47,742	18	40,127	1	23,790
Total money expended	£424,648	14	382,002	9	320,374	1	215,499

The saving effected on the sum expended for the relief of the poor in 1837, as compared with the expenditure of

1834, was therefore 46 per cent.; while the saving on the entire expenditure, comparing those two years, was 47 per cent.

The number of turnpike-roads' trusts in Kent, ascertained in 1835 under the Act 3 and 4 William IV., chap. 80, was 50; the number of miles of road under their charge was 586. The annual income arising from tolls and parish compositions in lieu of statute duty was, in 1835, 73,674*l.* 1*s* 6*d.*, and the annual expenditure in the same year was 72,801*l.* 18*s.* 7*d.*, as follows:—

	£.	s.	d.
Manual labour	15,112	9	5
Team labour and carriage of materials	10,767	4	0
Materials for surface repairs	8,144	14	8
Land purchased	998	0	3
Tradesmen's bills, law charges, &c.	4,677	8	4
Salaries of treasurer, clerk, and surveyors	3,708	7	10
Improvements	5,743	5	2
Interest of debt	10,321	6	7
Towards redemption of the debt	11,089	10	0
Incidental expenses	2,239	12	4

The county expenditure in 1834, exclusive of that made for the relief of the poor, was 16,692*l.* 15*s.* 6*d.*, and was disbursed as follows:—

	£.	s.	d.
Bridges, building, repairs, &c.	1,538	0	6
Gaols, houses of correction, and maintaining prisoners	5,651	0	11
Shire-halls and courts of justice, building, repairing, &c.	260	13	10
Lunatic asylum	1,105	17	4
Prosecutions	3,562	14	8
Clerk of the peace	1,102	8	8
Conveyance of prisoners before trial	1,475	11	1
Apprehending and conveying vagrants		15	3
Constables, high and special	226	18	10
Coroner	419	6	0
Miscellaneous	1,319	8	5

The number of persons charged with criminal offences within the county in each of the three septennial periods ending with 1819, 1826, and 1833, were 2741, 3800, and 4640, being an average of 391 annually in the first period, of 543 in the second period, and of 663 in the third period. The numbers accused in subsequent years were—

1834	775
1835	894
1836	872
1837	896

Of the number accused in 1837 there were—

	Males.	Females.	Total.
For offences against the person	50	3	53
„ „ against property, with violence	48	5	53
„ „ „ without violence	623	131	754
„ forgery and offences against the currency	21	5	26
„ other offences, not included above	8	2	10
	750	146	896

The number of persons against whom bills were not found by the grand jury, and who were acquitted on trial, was 246; of the remaining 650 who were convicted, 481 were for simple thefts, and 25 for common assaults. There were 9 persons sentenced to death; of these 8 had their punishment commuted to transportation for life, and the other to transportation for seven years. Of the remaining convicts there were transported—

For life	34
„ 15 years	2
„ 14 years	24
„ 10 years	1
„ 7 years	90
	151

Imprisoned for 2 years and above 1 year	12
„ 1 year and above 6 months	56
„ 6 months and under	410
	478
Whipping, fine, and discharge on sureties	12

The ages of the persons accused were—

	Males.	Females.
12 years and under	13	4
16 „ and above 12	97	14
21 „ „ 16	229	41
30 „ „ 21	218	32
50 „ „ 30	150	43
60 „ „ 50	23	7
Above 60	7	3
Age could not be ascertained	13	2

Their state of instruction was as follows:—

	Males.	Females.
Could neither read nor write	298	72
„ read and write imperfectly	398	71
„ read and write well	33	1
Had received superior instruction	8	0
State of instruction could not be ascertained	13	2

The number of electors qualified to vote for the county members in Kent at the registration of 1837 was, for the eastern division 7293, and for the western division 8132, being about 1 in 30 of the whole population, and about 1 in 10 of the male population 20 years of age and upwards, as taken in 1831.

There are 20 savings' banks in Kent. The number of depositors in these, and the amount of their deposits as they stood on the 20th of November in each of the last five years, were as follows:—

	1833.	1834.	1835.	1836.	1837.
Number of depositors	18,188	19,312	20,010	21,326	22,149
Amount of deposits	£531,018	£566,017	£582,056	£613,804	£629,083

The deposits of the last two years were divided in the following classes:—

		1836. Depositors.	1836. Deposits.	1837. Depositors.	1837. Deposits.
Not exceeding	£20	11,836	£82,248	12,506	£86,194
„	50	5,814	179,553	5,867	181,857
„	100	2,385	164,325	2,442	168,454
„	150	800	96,281	838	101,200
„	200	399	67,862	408	68,872
Above	200	92	23,535	88	22,506
		21,326	613,804	22,149	629,083

Education.—The following summary is taken from returns made to the House of Commons in the session of 1835:—

	Schools	Scholars.	Total.
Infant schools	207		
Number of infants at such schools; ages from 2 to 7 years:—			
Males		1,325	
Females		1,711	
Sex not specified		1,479	
			4,515
Daily schools	1488		
Number of children at such schools; ages from 4 to 14 years:—			
Males		24,241	
Females		18,496	
Sex not specified		6,469	
			49,206
Schools	1695		
Total of children under daily instruction			53,721
Sunday schools	479		
Number of children at such schools; ages from 4 to 15 years:—			
Males		15,791	
Females		15,556	
Sex not specified		6,176	
			37,523

Assuming that the population between the ages of 2 and 15 has increased in the same proportion with the whole population since 1821, when the relative population at different ages was last taken, and likewise assuming that the whole population has increased since 1831 in the same ratio as it did in the ten years preceding that date, we find by approximation that there were 127,096 children between the ages of 2 and 15 years in Kent in 1834, when these returns were obtained. Thirty-one Sunday-schools are returned from places where no other school existed, and the children

taught in these (1005 in number) cannot be supposed to have attended any other school. At all other places Sunday-school children are able to resort to other schools also, and there can be no doubt that many do so resort; but in what number or proportion duplicate entry is thus occasioned in the Parliamentary Returns there are no means of ascertaining. · Ninety-two schools, containing 7209 children are returned from various places as being both daily and Sunday-schools, and duplicate entry is known to have been thus far created. Making due allowance for this circumstance, it may perhaps be fairly concluded that at the time the inquiry was made little more than three-fifths of the children between the ages of 2 and 15 were receiving instruction of any kind in schools within the county.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	2	262	7	406	181	2,519	17	1,328
Daily Schools	129	7180	72	5,344	1197	29,628	90	7,054
Sunday Schools	26	1731	410	32,011	1	30	42	3,751
Total. . . .	157	9173	489	37,761	1379	32,177	149	12,133

The schools established by Dissenters, included in the above statement, are—

		Schools.		Scholars.
Infant schools	. .	..		..
Daily schools	. .	12	containing	844
Sunday-schools	. . .	148	„	15,486

The schools established since the inquiry of 1818 are—

			Scholars.
Infant and other daily schools .	986	containing	31,410
Sunday schools . . .	349	„	29,333

No school in Kent appears to be confined to the children of parents belonging to the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists, together with schools for the children of Roman Catholic parents.

Lending-libraries of books are attached to 53 schools in the county of Kent.

KENT, WILLIAM, an artist of moderate ability as a painter and sculptor, nevertheless one of considerable ability and influence as an architect and landscape-gardener, was born in Yorkshire, in 1684. Both his parentage and education were humble, and he was apprenticed to a coach-painter. Conceiving however that he had abilities which ought to elevate him above that grade, he attempted to establish himself as a portrait and historical painter, and so far attracted notice that some gentlemen raised a contribution for the purpose of enabling him to go and study in Italy. Thither he accordingly proceeded in 1710, and remained there several years, till he had the extreme good fortune to become acquainted there with the earl of Burlington in 1716. The noble patron not only brought home his protégé, and exerted all his influence and authority in matters of taste to recommend him to others, but took him under his own roof, where he remained till his death, April 12, 1748. How far Kent assisted his patron in his designs, or the latter assisted him, is doubtful; but it is certain that he soon discovered greater capacity for architecture than he had done for painting: and if it be true that the designs for Holkham, the seat of the earl of Leicester, in Norfolk, emanated principally, if not entirely, from him, that single edifice alone proves him to have possessed very superior talent and taste as an architect, it being a chef-d'œuvre in plan, and possessing many graces and beauties of design. As architect and landscape-gardener he was in his proper sphere, and followed both pursuits with the true spirit of an artist. In landscape-gardening, in fact, he forms an epoch, and may justly be considered as the father of the English style of gardening; for, as Walpole, who has not been niggard of praise towards him, observes, he was 'painter enough to taste the charms of landscape, bold and opinionative enough to dare and to dictate, and born with a genius to strike out a great system from the twilight of imperfect essays.' Shakspeare's monument in Westminster Abbey will preserve his name as a sculptor, without at all adding to his reputation. It is therefore fortunate for it that it will bear such retrenchment without injury to its vital part.

KENT, JAMES, a distinguished and deservedly popular composer of English church music, was born at Winchester, in 1700, and at an early age placed as a chorister in the cathedral of that city, but soon removed to London, and admitted as one of the Children of the Chapel Royal, under the celebrated Dr. Croft, then Master of the Children. After completing his education, he was chosen organist of Finden, in Northamptonshire, and subsequently was appointed organist of Trinity College, Cambridge, whence he removed, in 1737, upon being elected to fill the same situation in the cathedral of his native place, an office which he resigned in favour of his pupil, Mr. Fussell, in 1774. He died, deeply regretted, in 1776.

Mr. Kent was very serviceable to Dr. Boyce while the latter was preparing his magnificent work, the *Collection of Cathedral Music*, and his assistance is duly acknowledged by that learned editor. In 1773 he published his now well-known volume of *Twelve Anthems*, among which are, 'Hear my Prayer,' 'When the Son of Man,' 'My Song shall be of Mercy,' and others familiar to and the delight of the congregations of our cathedrals. Upon presenting a copy of this work to Trinity College, the Master and Fellows voted him a valuable piece of plate. After his decease, a *Morning and Evening Service, and Eight Anthems*, composed by him for the Winchester choir, were collected and printed by Mr. Corfe, of Salisbury; but the probability is that the author never intended them for publication, for only the service and one of the anthems admit of comparison with the productions he himself gave to the world.

'Mr. Kent was remarkably mild in his disposition, amiable in his manners, exemplary in his conduct, and conscientiously diligent in the discharge of his duties. His performance on the organ was solemn and impressive, and he was, by competent judges, considered as one of the best musicians of the age in which he lived.' (*Harmonicon.*)

KENT'S HOLE, a cavern near Torquay, which has yielded a great quantity of bones, very similar, as to the species of animals to which they belong, and the condition in which they are preserved, to the bones in Kirkdale Cave. The same explanation of the phenomena probably applies to both cases. [KIRKDALE.]

KENTUCKY, one of the republics constituting the United States of North America, is situated between 36° 30′ and 39° 8′ N. lat., and between 82° and 89° 30′ W. long. Its greatest length is 380 miles, and its mean width 99 miles. The area is stated at 37,680 square miles. Its boundary-lines are formed on three sides by rivers. The Mississippi on the west divides it from the State of Missouri for 42 miles. The Ohio runs along its northern side, in a winding course of 583 miles, separating it from the states of Illinois, Indiana, and Ohio. The Big Sandy River constitutes the boundary between Kentucky and Virginia for 70 miles, but the remainder of the boundary-line between these two states is formed by one of the ridges of the Alleghany Range, called the Cumberland Mountains. The boundary-line between Kentucky and Tennessee, which is to the south, is formed by two straight lines, the eastern running from the Cumberland Mountains eastward to the Tennessee River for 242 miles, on the parallel of 36° 35′ N. lat., and the western between the last-named river and the Mississippi for 84 miles, on the parallel of 36° 30′. Both lines are united by the river Tennessee, whose course constitutes the boundary-line for 12 miles.

Surface and Soil.—The south-eastern portion of Kentucky, which is less than one-tenth of the whole state, is covered with ridges of mountains and high hills, the slopes of which are rather steep, and which contain between them narrow, deep, and gloomy valleys. The whole of this region is well wooded, especially the lower parts of the hills and the vales. None of the summits of these mountains appear to attain the height of 3000 feet above the sea, and their mean elevation probably does not exceed 2000 feet. The highest ranges are the Cumberland Mountains along the boundary-line of Virginia, and the Laurel Mountains, which run parallel to the Cumberland Mountains, and join them between the upper branches of the Kentucky and Cumberland rivers. To the north and west of the hilly region lies what may be called the upland region, which extends from the Big Sandy River, on the boundary of Virginia, to about 86° W. long., and comprehends more than half of the whole area of the state. Its surface is undulating, with gentle ascents and descents, but it is intersected by numerous

deep cuts, which are from 100 to 300 feet below the surface of the plain, and in which the rivers run. The plains belonging to these rivers are narrow. Though this upland region is sparingly provided with spring-water, its soil is of the first quality, and as fertile as any part of the United States. The western portion of the state is divided between the Barrens and a country which is partially hilly. The Barrens in their natural state are generally destitute of trees, and resemble the prairies or savannas which occur north of the Ohio River; but the level surface is diversified by a considerable number of gently rising hills, called *oak knobs*, on account of the trees which cover them. Though this tract does not deserve the name which it bears, it is of inferior fertility when compared with the adjacent countries. The Barrens occupy chiefly the tract between the Green River and Cumberland River, on the borders of Tennessee. On the north and west the Barrens are surrounded by a more broken and hilly country, which gradually passes to the low flats which skirt the Ohio and Mississippi rivers. This tract is superior to the Barrens in fertility, but cannot be compared with the upland region.

Rivers.—Along the northern boundary runs the Ohio, which receives all the larger rivers that drain Kentucky. The most eastern is the Big Sandy River, which rises in Virginia on the western range of the Appalachian system, called the Great Flat-top Mountains, and traverses that state in a north-west direction; where it approaches the boundary-line, it turns nearly due north, and continues in that direction to its very mouth. Its course is stated to be nearly 200 miles, but it is not navigable to a great distance from its mouth, owing to some falls which occur where it issues from the mountain-region. The Licking River rises in Kentucky, and flows, with many windings, in a north-northwestern direction for nearly 200 miles. Though it swells in winter and spring to a considerable height, it has but little water in the other seasons; the limestone rocks through which it passes absorb the water which it brings down from the mountains. The different branches of the Kentucky River rise in the Laurel Mountains and form by their union a considerable stream, which first flows north-west, then west, and at last nearly due north. Its course is about 280 miles, and though it is very rapid, it may be navigated by small boats for 180 miles from its mouth at the time of high-water, but at other times not higher up than Frankfort. Green River rises in the western districts of the upland region and flows for the greater part of its course westward, then declines to the north-west, and finally to the north, joining the Ohio about 50 miles above the mouth of the Cumberland River. Its course is 280 miles, and it is navigable for small river-barges to a great distance, but the navigation is interrupted by falls, about 50 miles from its mouth. Cumberland River rises in the valley between the Cumberland Mountains and the Laurel Mountains, where it is called Clove River; it traverses both the mountain and upland region generally in a western direction, but on approaching the Barrens it turns southward, and enters Tennessee, where it makes a large bend to the southward, and then re-enters Kentucky with a north-western course, continuing in that direction to its mouth, which is ten miles above that of Tennessee River. It is above 500 miles in length, and as its current is comparatively gentle, it offers an easy navigation for sloops as far up as Nashville in Tennessee, and it is stated to be navigable for river-boats 300 miles farther up. The Tennessee River flows only about 70 miles through Kentucky, and properly belongs to Tennessee. [TENNESSEE.]

Climate.—The mean annual temperature seems to be about 55°, and consequently 5° higher than that of London, but the differences in the extremes of heat and cold are much greater. The winters are long and severe: they begin about Christmas, and last three months. The thermometer annually descends as low as 25°, and has been known to sink as low as 14° of Fahr. Snow falls every winter, but not in great quantities. In summer the heat is sometimes very great, and the thermometer rises to 94° and 95°. In spring and autumn south-west winds prevail, and the weather is delightful. The north-west wind produces great cold in winter, but it seldom continues many days. Rain falls abundantly in winter and spring, but in the other seasons the weather is rather dry and constant. Some slight shocks of earthquakes have occurred.

Productions.—The cerealia which are most extensively cultivated are Indian corn, wheat, rye, and oats, and the two last-mentioned kinds of grain are said to thrive better than in the states on the shores of the Atlantic. Rye is commonly used for the distilling of whiskey. In the south-western districts, near and on the Tennessee, Cumberland, and Mississippi rivers, cotton is raised in abundance; and the tobacco which is grown in these districts and the rich lands farther east supplies a considerable article of exportation. Hemp and flax are generally cultivated. The principal fruit-trees are apples and peaches; from the former cider is made, and from the latter peach-brandy, of which there is a great consumption. Cattle are numerous, and great flocks of sheep pasture on the Barrens; the breed of sheep has been improved by crossing them with merinos.

As the greatest part of the country is covered with forests, wild animals are still numerous, as deer, panthers, bears, wolves, foxes, and hares, but the buffalo and the elk have disappeared. Beavers and otters are still found in the rivers. Among the wild birds the turkey is still abundant; it weighs from 10 to 25 pounds. Bees are common in the woods, and make their nests in hollow trees.

The forests contain many timber-trees. Those of the mountains and upland region consist of liriodendron, elm, oak, hickory, black-walnut, cherry, and others; those of the Barrens are chiefly oak, chesnut, and elm.

Bituminous coal and iron abound in the north-western district, and iron also occurs in the districts lying farther westward; but both are of inferior quality. Salt seems to be generally diffused through the country: the salt-springs are numerous, and many of them have been turned to advantage. Saltpetre exists in most of the caverns which occur in the limestone-rock of the upland region, and is most abundant in the Great Cave near Crooked Creek, the length of which is stated to be not less than ten miles.

Inhabitants.—The native tribes, which rendered the settlement of this state so difficult and dangerous seventy years ago, have entirely disappeared, and the population now consists entirely of whites and negroes, and a mixture of the two. The free population comprehended, according to the census of 1830, 523,490 individuals, and the number of slaves was 165,350, making a total of 688,840 souls. The inhabitants are almost exclusively employed in agricultural pursuits, the number of persons engaged in manufactures being comparatively very small. The most important manufacture is the construction of vessels, small and large, for the navigation of the Ohio and Mississippi.

Political Divisions and Towns. Kentucky is divided into 83 counties, but as the country has only been settled for about 70 years, it does not contain any large towns. Frankfort, the capital, is built on the right banks of the Kentucky River where it ceases to be navigable for large vessels. It contains about 2000 inhabitants. Many vessels of small size are built here. Lexington, which was formerly the capital, contained (in 1830) above 6000 inhabitants, and some manufactures of cotton, hemp, and paper. Transylvania University, at Lexington, is the most extensive literary institution in the United States west of the Appalachian Mountains. It was founded in 1798, and reorganised in 1818. A well-attended school of medicine and a school of law are connected with this university. Louisville, on the banks of the Ohio, is situated near the great rapids of that river. As these rapids cannot be passed at low water, and even at high water are dangerous, a canal has been cut along the bank, which begins above the rapids at Beargrass-creek, and terminates below them at Shippingport. This canal is 10 miles long. Louisville, which is the port of the upland region and the place from which the produce of the country is sent down the Ohio and Mississippi, contains above 10,000 inhabitants, and has some extensive distilleries of whiskey and manufactures of cordage and bagging. On the Ohio there is also Bardstown, with 1200 inhabitants; it is the seat of a Catholic bishop and a Roman Catholic college. Maysville, which has 2000 inhabitants and a considerable trade with the neighbouring states, is also on the Ohio. Besides the literary institutions already mentioned, the Methodists and Baptists have each a college, and the Presbyterians have two.

Commerce.—The articles of commerce consist of different kinds of grain, tobacco, hemp, live cattle, whiskey, and peach brandy. The greatest part is sent down the Ohio and Mississippi to New Orleans, between which place and Louisville steam-boats from 200 to 300 tons burthen and upwards are constantly plying. Since the introduction of steam-

boat navigation, the commerce of Kentucky has greatly increased.

History.—It is probable that this part of America once was the seat of a nation which had made some progress in civilization. We may come to this conclusion from observing the extensive fortifications which occur in several places, but especially on the banks of the Ohio, opposite Scioto River, and are now overgrown with high forest-trees. The first Europeans arrived in Kentucky in 1767, and the first settlement was formed in 1775, though Daniel Boone is said to have settled in Kentucky some years earlier. It was then a part of Virginia, but the population having increased rapidly, Virginia consented to a separation, and in 1792, only seventeen years after the first settlement, Kentucky became one of the United States. Its constitution was settled in 1799. The legislative body consists of a senate and house of representatives. The representatives are chosen annually by all the free male citizens (negroes, mulattoes, and Indians being excepted) of 21 years of age, who have been two years resident in the state. The number of representatives may vary between 58 and 100, which latter is now the number. The senate now consists of thirty-eight members, who are elected for four years, one-fourth of the number being chosen annually. The executive power is vested in the governor, who is elected for four years by all the citizens entitled to the suffrages. Kentucky sends two members to the senate, and twelve members to the house of representatives at Washington.

(Darby's *View of the United States;* and Warden's *Account of the United States.*)

KENYON, LLOYD, LORD, the second son of Lloyd Kenyon, Esq., by Jane, daughter of Robert Eddowes of Eagle Hall in Cheshire, was born at Greddington in Flintshire, on the 5th of October, 1732. He was descended from an antient family in Lancashire, which had migrated into North Wales at the commencement of the last century. His father lived independently as a country gentleman, and belonged to the commission of the peace for his county. The education of the future chief-justice was, from the straightened means of the parent, very defective. He was sent early to the grammar-school at Ruthin, but was taken away before he had time to do more than acquire a little Latin. At the age of fourteen he was articled to Mr. Tomlinson, an attorney in large practice at Nantwich in Cheshire, with whom he remained for seven years, during which time his diligence and shrewdness procured him so much of his master's favour that he expected at the end of his clerkship to be taken into partnership. In this expectation he was however disappointed, and thereupon determined upon being called to the bar. In 1754 he took chambers at the Temple, and became a member of Lincoln's Inn. While a student he devoted himself with great earnestness to the law, and to the law only; and in doing this he made smaller sacrifices than most people. He had neither a literary taste nor a love for pleasure; and his pecuniary resources were but scanty. Mr. Kenyon was called to the bar in Hilary Term, 1761, but in consequence of the want of a professional connexion, and being of a character too honourable and independent to stoop to little artifices, many years elapsed before he obtained business. Still he laboured patiently and unceasingly, frequenting the courts both of common law and equity, but more especially the latter, and attending both circuit and sessions. His attainments in all departments appear to have been not only considerable, but exact, and he acquired by degrees the reputation of being a sound lawyer, and a neat and safe equity draftsman and conveyancer. It is stated, that having by some suggestions, as amicus curiæ, attracted the notice of Mr. Thurlow, the then attorney-general, he had the offer made to him of sharing with Mr. Hargrave in the toil and profit of assisting him. In 1773, when he had been twelve years in the profession, he married Mary, third daughter of George Kenyon of Peele in Lancashire. He now began to rise into notice. In 1779 he was retained as one of the counsel for Lord Pigot in the state-prosecution of Shelton and others for depriving him of his government; and afterwards in the same year as leading counsel for Lord George Gordon. In April, 1782, on the accession of the Fox and Rockingham administration, he was appointed attorney-general. While holding this situation his conduct evinced that official intrigue and partisanship were not at all suited to his character. On the death of the marquis of Rockingham he retained his office with Pitt as chancellor of the exchequer, and went out with the Shelburne administration in the spring of the year following. In December he was reappointed attorney-general, having through all the ministerial changes of the day asserted his independence. To the character of an orator he had no pretension, being a man of little imagination, and expressing himself not only without elegance, but occasionally with vulgarity. He was no scholar, and yet he would insert Latin words and phrases without point or taste in his discourse.

In 1784 he was raised to the office of master of the rolls, and created a baronet; and in May, 1788, he was gazetted Lord Kenyon, Baron Greddington, and succeeded Lord Mansfield as chief-justice of the King's Bench. His appointment to this important and dignified situation was at the time unpopular with the profession generally. To the opinion of his brother judges he gave a reception not only of neglect, but almost of contempt; and whenever they ventured to differ from him (which only took place some half dozen times in fourteen years), he exhibited the same feelings which another person would do upon receiving a personal affront. To the barristers, both leaders and juniors, he was equally ungracious; and whenever anything escaped them not in accordance with his sentiments, he castigated them in terms neither measured nor in character with the situation which he filled. To some leading men he would take a personal dislike, and allow no opportunity for mortifying them to escape him; Mr. Law, afterwards Lord Ellenborough, was one of them.

With the press Lord Kenyon was in high favour; for he struck sternly and with indignation at those offenders who are the peculiar objects of popular dislike. But while doing so he frequently gave too easy credit to accusation, and allowed himself to punish often with a severity not sufficiently tempered. As an instance of this we may mention the case of Mr. Lawless, a solicitor, against whom some serious charges were brought. Before the case was adjudicated, Lord Kenyon ordered Mr. Lawless to be suspended from practising until his case was disposed of. In vain did he tell him that he had eighty cases in his office, and that he should be ruined. The charges against Mr. Lawless were found to be wholly without foundation; but the blow was struck, he sunk under the unmerited disgrace, and died of a broken heart. The vices of the wealthy met with no favour from him. In actions for criminal conversation, likewise, he directed juries (over whom no judge had greater power) to give damages of very large amount, and this even in cases where the collusion of the parties or the vicious conduct of the husband ought to have made nominal damages more than sufficient. So strongly did the judge feel with regard to this crime, that he is reported thus to have expressed himself:—'There was a time in the history of this country when the laws of the Puritans, which were mixed with a great deal of virtue, if I mistake not, subjected this offence to the punishment of death. I do not look forward to a punishment so severe; but I wish some personal punishment were attached to those who inflict so dreadful and incurable a wound on the peace of private families.' Gamblers met with similar treatment from him; and he threatened that if any prosecutions were fairly brought before him, and the guilty parties convicted, whatever might be their rank or station in the country, though they were the first ladies in the land, they should certainly exhibit themselves in the pillory. As a judge, he recognised no distinction between the gamblers of St. James's and the pickpockets of the Strand. Lord Kenyon exerted himself to the utmost to put an end to duelling, and he declared that whoever was convicted of having murdered his fellow-creature in a duel should suffer the course of the law; and he on more than one occasion directed the jury to that conclusion, but without success. Flagitious libels against individuals were punished by him with merited severity.

But, of all writings, those partaking of the character of political libels were those against which he directed, with the most unflinching perseverance, all the terrors of the law. This was a more dangerous and delicate ground to tread upon, and people will approve or disapprove of his conduct in this particular according to the view which they take with regard to the liberty of speech upon these points. Certain it is, that since the time of Lord Kenyon the practice of prosecuting for political libels has gradually fallen into disuse; nor would the pillory, as part of the punishment for putting forth opinions, however mischievous or absurd, be at this time tolerated.

Lord Kenyon trusted too much to the power of the terrors of the law in guarding the rights of property from fraud or violence; and he inflicted death as the most terrible, and therefore the most preventive punishment. That this proceeded rather from a mistaken judgment—an ignorance of, or a want of power to give sufficient weight to, those circumstances which exert a more powerful influence upon human character, and not from a cold and sanguinary disposition, the following anecdote may be considered as a proof:—He passed sentence of death upon a young woman who had committed a theft; she fainted: Lord Kenyon, in great agitation, cried out, 'I don't mean to hang you—Will nobody tell her that I don't mean to hang her?'

Indeed, in behalf of poor and ignorant offenders who were the dupes or tools of knaves his kindly feelings were often displayed, and humble individuals of the working classes who were harassed by informers were sure to be shielded by him. A prosecution was commenced against a man for practising the trade of a tailor without having served an apprenticeship, and an attempt was made to punish him for several acts done in the same day. 'Prosecute the man,' said Lord Kenyon, 'for different acts in one day! Why not sue for penalties on every stitch?'

Lord Mansfield, when chief-justice, had somewhat unsettled the bounds of the courts of law; but Lord Kenyon, with much wisdom, reverted to the antient strictness, and he expressed his determination to maintain it. 'I have,' he said, 'been in this profession more than forty years, and have practised both in courts of law and equity; and if it had fallen to my lot to form a system of jurisprudence, whether or not I should have thought it advisable to establish different courts, with different jurisdictions, it is not necessary to say. But influenced as I am by certain prejudices that have become inveterate with those who comply with the systems found established, I find that in these proceeding by different rules, a certain combined system of jurisprudence has been framed most beneficial to the people of this country, and which I hope I may be indulged in supposing has never yet been equalled in any country on earth. Our courts of law only consider legal rights—our courts of equity have other rules by which they sometimes supersede strict legal rules, and in so doing they act most beneficially for the subject.' 'I will not,' he said, in another instance, 'overturn the law of the land as it has been handed down to me.'

He wisely refused to allow the plain words of a statute to be refined away, however severe in its enactments, by any subtle sophistry. 'The arguments,' he said, 'that have been pressed upon us might have had some effect if they were addressed to the legislature; but we are sitting in a court of law, and must administer justice according to the known laws of the land. Let application be made to the legislature to amend the act: as long as it remains upon the statute-book we must enforce it.'

Mr. Charles Butler, after praising Lord Kenyon's intuitive readiness, complains 'that he seldom exhibited the intermediate patient discussion. The consequence was, that though the decision was right, the ground of it was sometimes obscure, and the objections to it in the minds of the hearers were not always removed. This lessened the merit of his adjudications; but they are most deservedly held in the highest respect, and considered of the highest authority.'

At Nisi Prius he never brought a book with him into court to refer to. The extent as well as the arrangement of his legal knowledge needed no such assistance. In performing the laborious duties of his profession he was diligent and exact, and proceeded with so much expedition as often to get through twenty-five or twenty-six causes to the entire satisfaction of the court.

He died in 1802, sorrow-stricken by the loss of his eldest son, after having accumulated a fortune of 300,000*l.*

In his private habits Lord Kenyon was temperate, frugal even to parsimony, and an early riser. For his happiness he looked to his home, being most deeply attached to his family. He entirely disregarded outward appearance: his dress was shabby, his equipage mean, while he entirely neglected to exercise the hospitality becoming his high station and large fortune. (*Law Magazine*, No. 37, p. 49.)

KEPLER, JOHN, was born at Weil in the duchy of Wirtemberg, 21st December, 1571. He was a seven months child, very weak and sickly, and survived with difficulty a severe attack of smallpox. His parents, Henry Kepler and Catherine Guldenmann, were of noble descent, although their circumstances were far from affluent. The father, at the time of his marriage, was a petty officer in the service of the duke of Wirtemberg, and joined the army in the Netherlands a few years after the birth of his eldest son John. Upon his return to Germany he learnt that an acquaintance for whom he had incautiously become security had absconded, and had left him the unexpected charge of liquidating the bond. This circumstance obliged him to dispose of his house and nearly the whole of his possessions, and to become a tavern-keeper at Elmendingen. Young Kepler had been sent in the year 1577 to a school at Elmendingen, and he continued there until the occurrence of the event to which we have just alluded, and which was the cause of a temporary interruption in his education, as it appears that he was taken home and employed in menial services until his twelfth year, when he returned to school. In 1586 he was admitted into the monastic school of Maulbronn, where the cost of his education was defrayed by the duke of Wirtemberg. The regulations of this school required that after remaining a year in the superior classes the students should offer themselves for examination at the college of Tübingen for the degree of Bachelor. On obtaining this degree they returned with the title of veterans; and having completed the prescribed course of study, they were admitted as resident students at Tübingen, whence they proceeded in about a year to the degree of Master. During his under-graduateship Kepler's studies were much interrupted by periodical returns of the disorders which had so nearly proved fatal to him during childhood, as also by the dissensions between his parents, in consequence of which his father left his home, and soon after died abroad. Notwithstanding the many disadvantages he must have laboured under from the above circumstances, and from the confused state in which they had left his domestic affairs, Kepler took the degree of Master in August, 1591, attaining the second place in the annual examination. The first name on the list was John Hippolytus Brentius.

While thus engaged at Tübingen, the astronomical lectureship of Grätz, the chief town in Styria, became vacant by the death of George Stadt, and the situation was offered to Kepler, who was forced to accept it by the authority of his tutors, although we have his own assurance that at that period he had given no particular attention to astronomy. This must have been in the year 1593-4. In 1596 he published his 'Mysterium Cosmographicum,' wherein he details the many ingenious hypotheses which he had successively formed, examined, and rejected, concerning the number, distance, and periodic times of the planets; and finally, proposes a theory which he imagines will account in a satisfactory manner for the order of the heavenly bodies, which theory rests upon the fancied analogy between the relative dimensions of the orbits of those bodies, and the diameters of circles inscribed and circumscribed about the five regular solids. In 1597 Kepler married Barbara Muller von Muhleckh, a lady who, although two years younger than himself, was already a widow for the second time. This alliance soon involved him in difficulties, which together with the troubled state of the province of Styria, arising out of the two great religious parties into which the empire was then divided, induced him to withdraw from Grätz into Hungary, whence he transmitted to a friend at Tübingen, several short treatises—'On the Magnet,' 'On the Cause of the Obliquity of the Ecliptic,' and 'On the Divine Wisdom as shown in the Creation.' In 1600 Kepler, having learned that Tycho Brahé was at Benach in Bohemia, and that his observations had led him to a more accurate determination of the eccentricities of the planets' orbits, determined on paying him a visit, and was welcomed in the kindest manner by Tycho, by whom he was introduced the following year to the emperor, and honoured with the title of imperial mathematician, on condition of assisting Tycho in his calculations. Upon the death of Tycho, which happened in the month of October of the same year, Kepler succeeded him as principal mathematician to the emperor. To this great man Kepler was under many obligations, not merely for the pecuniary assistance and hospitality which himself and family so often experienced from Tycho, and upon which at one period they entirely depended for subsistence, but still more for the sound advice which he gave him, to abandon speculation, and to apply himself to the deduction of causes from their observed effects,—advice which Kepler greatly needed, and to which,

if he had adhered more closely, his fame would have been even greater than what it now is. It is to be regretted that upon several occasions the conduct of Kepler towards Tycho Brahe ill accorded with the generosity of the latter, though this appears to be attributable rather to the impetuosity of Kepler's temper, than to any want of gratitude towards his benefactor. It has been said that Kepler was appointed imperial mathematician on condition of assisting Tycho in his calculations. The object of these calculations was the formation of new astronomical tables generally, which were to be called the Rudolphine Tables, in honour of Rudolph the then emperor of Bohemia, who had promised, not merely to defray the expense of their construction, but likewise to provide Kepler with a liberal salary; neither of which his circumstances ever permitted him to fulfil. The part more particularly allotted to Kepler was the reduction of Tycho's observations relative to the planet Mars, and to this circumstance is mainly owing his grand discovery of the law of elliptic orbits, and that of the equable description of areas. The pecuniary difficulties however in which he found himself almost incessantly involved in consequence of the non-payment of his salary, greatly retarded the progress of his labours, and obliged him to seek a livelihood by casting nativities. The Rudolphine Tables were therefore postponed, and he applied himself to works of a less costly character, from which he might expect to derive more immediate remuneration. In 1602 appeared his 'Fundamental Principles of Astrology;' in 1604 his 'Supplement to Vitellion;' in 1605 'A Letter concerning the Solar Eclipse;' and in 1606 'An Account of the New Star which had appeared in 1604 in the Constellation Cassiopeia.' Of these the 'Supplement to Vitellion' was important, as containing the first consistent theory of that branch of optics termed dioptrics.

At length, in 1609, appeared his 'New Astronomy,' containing his great and extraordinary book 'On the Motion of Mars;' a work which holds the intermediate place, and is the connecting link, between the discoveries of Copernicus and those of Newton. The introduction is occupied in refuting the then commonly-received theory of gravity, and in declaring what were his own opinions upon the same subject. In the course of this discussion he states distinctly that since the attractive virtue of the moon extends as far as the earth, as is evident from its enticing up the waters of the earth, with greater reason it follows that the attractive virtue of the earth extends as far as the moon, and much farther; and he likewise asserts that if two bodies of like nature be placed in any part of the world near each other, but beyond the influence of any other body, they would approach each other like two magnets, each passing over a space reciprocally in proportion to its mass; so that if the moon and earth were not retained in their orbits by their animal force, or some other equivalent to it, the earth would approach the moon by the 54th part of their distance, and the moon would approach the earth by the remaining 53 parts. Previous to the publication of this remarkable work it was supposed that each planet moved uniformly in a small circle, called an *epicycle*, the centre of which epicycle moved with an equal angular velocity in the opposite direction round the centre of the earth, thus describing a larger circle which was called the *deferent*. Subsequent observations being found irreconcileable with the foregoing hypothesis, it was modified by supposing the uniform angular motion of the epicycle to be described about a point not coinciding with the centre of the earth, a necessary consequence of which supposition was that the linear motion of the epicycle ceased to be uniform. The work of Copernicus 'De Revolutionibus Orbium Cœlestium' had appeared in 1543, wherein he considers the sun to be the fixed centre about which the planets move with uniform motions, but retains the complicated machinery of the deferent and epicycle in order to account for the variations arising from the actual inequality of the planet's motion. The system of Tycho Brahe himself was identical with one which Copernicus had rejected, and consisted in supposing the sun to revolve about the earth, carrying with it all the other planets revolving about him; and indeed Tycho not only denied the revolution of the earth about the sun, but likewise its diurnal rotation upon its axis. Such is an imperfect outline of the theory of the universe before the time of Kepler. The theory adopted by Kepler, in the early part of his discussion of Tycho's observations, appears to have been that the orbit of each planet, including the earth, was circular; that it was described with a uniform angular velocity about a point within, called the centre of the equant, and that the centre of the orbit lay in the line joining the centre of the equant and the place of the sun, but not equidistant between those points, as had been previously supposed. With respect to the earth however, in particular, he had started with the erroneous opinion, then generally entertained by all astronomers, that the centre of the earth's equant coincided with that of its orbit, and that consequently not only its angular but also its linear motion was uniform, although its distance from the sun was known to vary. After four years of laborious calculation, the non-accordance of his results with observation obliged him to fix upon the bisection of the line joining the centre of the equant and the place of the sun, for the centre of the planet's orbit; and shortly after he was led to the conclusion that one of the two other principles upon which his theory rested must be erroneous; that either the orbit of the planet was not a perfect circle, or that there was no point within it round which it moved with a uniform velocity.

Having easily proved that at the apsides, that is, the two points of the planet's orbit which are nearest to and farthest from the sun,—the times of describing equal small arcs are nearly proportional to the distances of the planet from the sun, he concluded with his accustomed precipitancy that the same relation existed at all other points of the orbit. An almost immediate consequence of this assumption was that the time of describing an arc of any length whatever would be proportional to the sum of all the lines which could be drawn from the sun to every point of that arc; but as the calculation of these distances was found to be excessively operose, he substituted the approximate area of the figure bounded by the arc and the two extreme distances for the sum of all the distances, and was thus led from erroneous principles to that beautiful law of the planetary motions by which the area described by the revolving radius vector is proportional to the time of its description. When however he came to apply this theory to the motion of Mars, the excentricity of whose orbit is much greater than that of the Earth's, he found that the circular hypothesis gave results differing from the observations of Tycho by at least eight minutes, and as he considered that difference too great to be attributed to the error of so exact an observer, he concluded that the suspicions, which, as was above stated, he had long previously entertained, relative to the form of the planets' orbits, were well founded, at least with respect to the planet Mars. At length, he deduced from observations of that planet near the quadratures, that its orbit was an oval elongated in the direction of its apsides, and was thus led to the law of elliptic motions.

The elliptic form of the orbits and the equable description of areas constitute two of the three celebrated truths known by the name of Kepler's laws. The third, viz. that the squares of the periodic times are proportional to the cubes of the mean distances from the sun, was not discovered till twelve years after, although, before the publication of his 'Mysterium Cosmographicum,' he had been speculating, as we have seen, upon finding some relation between those distances and periodic times. The final discovery resulted, far less from philosophical deduction, than from the innumerable combinations which his ever-active fancy had been calling into existence during the previous seventeen years; and indeed when he at length detected the relation which he had so long been in search of, he was only able to offer an explanation of it upon four suppositions, three of which are now known to be false.

In 1620 Kepler was visited by Sir Henry Wotton, the English ambassador at Venice, who finding him, as he was always to be found, oppressed with pecuniary difficulties, urged him to go over to England, where he assured him of a welcome and honourable reception; but Kepler could never determine on quitting the Continent. In 1624 he went to Vienna, where with difficulty he obtained 6000 florins towards completing the 'Rudolphine Tables,' together with recommendatory letters to the states of Suabia, from whom he also collected some money due to the emperor. It was not however till 1627 that these tables—the first that were calculated on the supposition that the planets move in elliptic orbits—made their appearance; and it will be sufficient to say of them, in this place, that had Kepler done nothing in the course of his whole life but construct these, he would have well earned the title of a most useful and indefatigable calculator. In 1630 he made a final attempt

to obtain a liquidation of his claims upon the imperial treasury, but the fatigue and vexation of his fruitless journey brought on a fever which terminated his life in the early part of November, 1630, and in his 59th year. His body was interred in St. Peter's churchyard at Ratisbon, and a simple inscription, which has long since disappeared, was placed on his tombstone. Upon the character of Kepler, upon his failures, and on his success, Delambre has pronounced the following judgment:—'Ardent, restless, burning to distinguish himself by his discoveries, he attempted everything; and having once obtained a glimpse, no labour was too hard for him in following or verifying it. All his attempts had not the same success, and, in fact, that was impossible. Those which have failed seem to us only fanciful; those which have been more fortunate appear sublime. When in search of that which really existed, he has sometimes found it; when he devoted himself to the pursuit of a chimera, he could not but fail; but even there he unfolded the same qualities, and that obstinate perseverance that must triumph over all difficulties but those which are insurmountable.'

The following is a list of Kepler's published works. His manuscripts were purchased for the library of St. Petersburg, where Euler, Lexell, and Kraft undertook to examine them and to select the most interesting parts for publication, but the result of this examination has never appeared.

List of Kepler's published works:—'Ein Calender,' Gratz, 1594; 'Prodromus Dissertat. Cosmograph.,' Tübingæ, 1596, 4to.; 'De fundamentis Astrologiæ,' Pragæ, 1602, 4to.; 'Paralipomena ad Vitellionem,' Francofurti, 1604, 4to.; 'Epistola de Solis deliquio,' 1605; 'De Stellâ Novâ,' Pragæ, 1606, 4to.; 'Vom Kometen,' Halle, 1608, 4to.; 'Antwort an Röslin,' Pragæ, 1609, 4to.; 'Astronomia Nova,' Pragæ, 1609, fol.; 'Tertius Interveniens,' Frankfurt, 1610, 4to.; 'Dissertatio cum Nuncio Sidereo,' Francofurti, 1610, 4to.; 'Strena, seu De nive sexangulâ,' Frankfurt, 1611, 4to.; 'Dioptrica,' Francofurti, 1611, 4to.; 'Vom Geburts Jahre des Heylandes,' Strasburg, 1613, 4to.; 'Respons. ad epist. S. Calvisii,' Francofurti, 1614, 4to.; 'Eclogæ Chronicæ,' Frankfurt, 1615, 4to.; 'Nova Stereometria,' Lincii, 1615, 4to.; 'Ephemerides 1617—1620,' Lincii, 1616, 4to.; 'Epitomes Astron. Copern. Libri i. ii. iii.,' Lentiis, 1618, 8vo.; 'De Cometis,' Aug. Vindelic., 1619, 4to.; 'Harmonice Mundi,' Lincii, 1619, fol.; 'Kanones Pueriles,' Ulmæ, 1620; 'Epitomes Astron. Copern. Liber iv.,' Lentiis, 1622, 8vo.; 'Epitomes Astron. Copern. Libri v. vi. vii.,' Francofurti, 1622, 8vo.; 'Discurs von der grossen Conjunction,' Linz., 1623, 4to.; 'Chilias Logarithmorum,' Marpurgi, 1624, fol.; 'Supplementum,' Lentiis, 1625, 4to.; 'Hyperaspistes,' Francofurti, 1625, 8vo.; 'Tabulæ Rudolphinæ,' Ulmæ, 1627, fol.; 'Resp. ad epist. J. Bartschii,' Sagani, 1629, 4to.; 'De anni 1631 Phænomenis,' Lipsæ, 1629, 4to.; 'Terrentii Epistolium cum Commentatiunculâ,' Sagani, 1630, 4to.; 'Ephemerides,' Sagani, 1630, 4to.; 'Somnium,' Francofurti, 1634, 4to.; 'Tabulæ Manuales,' Argentorati, 1700, 12mo.

(Abridged from the *Life of Kepler*, in the 'Library of Useful Knowledge;' with occasional reference to the *Système du Monde* of Laplace, and other works.)

A splendid edition of Kepler's 'Correspondence' was published under the auspices of the Emperor Charles VI., in 1718, by M. G. Hansch. It is entitled 'Epistolæ ad J. Keplerum,' &c., and the title-page has no place of publication, but the preface is dated from Leipzig. It contains a Life of Kepler.

KERMAN. [PERSIA.]

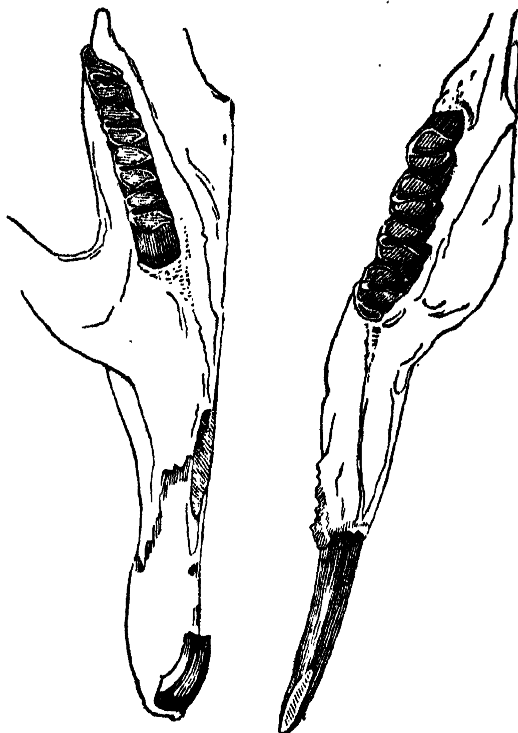
KERMANSHAW. [PERSIA.]

KERMES MINERAL, a peculiar sulphuret of antimony, formerly much, but now little used in medicine. Various processes, some in the humid and others in the dry way, have been proposed for obtaining it.

One of the best appears to be that of boiling six parts of powdered sesquisulphuret of antimony in a solution of about twenty times its weight of crystallised carbonate of soda in ten times its weight of water. After an hour's ebullition, the liquor is to be strained while hot, and allowed to cool very slowly, during which the Kermes Mineral separates in the state of a brownish-red powder, which, after due washing, is to be dried with a gentle heat.

According to Rose it is composed of sulphur 38·41 and antimony 61·59, which are very nearly in the proportion of 2½ equivalents of sulphur 40 + one equivalent of antimony 65.

KE'RODON, a genus of rodents, bearing in some respects resemblance to that of *Cavia*, but differing both in the locomotive and masticatory organs, established by M. F Cuvier. Dental formula:—Incisors $\frac{2}{2}$, molars $\frac{4-4}{4-4} = 20$



Teeth of Kerodon. (F. Cuvier.)

The molars all resemble each other, and are composed of two equal parts, each of a triangular or rather cordiform shape, united on the external side of the tooth, and separated on its internal side. These triangles or 'hearts' are each surrounded by their enamel, and filled with bony matter, and their separation produces an angular notch partly filled with cortical substance.

When M. F. Cuvier wrote, but one species, *Kerodon Moco*, was known, and this was discovered by Prince Maximilian of Neuwied, and noticed by him under the name of *Cavia rupestris*. The fur is ash-gray mixed with reddish yellow, and blackish above and whitish below. Size smaller than that of the guinea pig.

This species was found in the rocky places of the interior of Brazil near Rio San Francisco.

In 1836, Mr. Bennett exhibited to a meeting of the Zoological Society of London a rodent sent home among the animals collected by Captain Phillip Parker King, R. N., during his survey of the Straits of Magalhaens, and presented by him to the Society, which Mr. Bennett regarded as a second species of *Kerodon*, and for which he proposed the name of *Kerodon Kingii*. It was chiefly distinguishable from that discovered by Prince Maximilian by its more uniform colour. Excepting a slight dash of white behind the ear, and a longer line of the same colour marking the edge of each branch of the lower jaw, the animal is entirely gray; the upper surface being distinguished from the under by a greater depth of tint, and by the intermixture of a free grizzling of yellow and black. The crowns of the mo'ar teeth, as in the typical species, consist of bone surrounded by two triangles of enamel, the bases of which are connected by a short line of enamel passing from one to the other, all the lines being slender and sharply defined.

This species was found at Port Desire, on the eastern coast of Patagonia. (*Zool. Proc.*, 1835.)

KERRY, a maritime county of the province of Munster, in Ireland; bounded on the east by the counties of Limerick and Cork, on the south by the county of Cork and the æstuary of the river of Kenmare, on the west by the Atlantic Ocean, and on the north by the æstuary of the river Shannon, which separates it from the county of Clare. According to the map published under the superintendence of the Society

for the Diffusion of Useful Knowledge, Kerry is situated between 51° 41′ and 52° 33′ N. lat., and between 9° 7′ and 10° 30′ W. long. The greatest length in a direct line north and south is from the Priest's-leap mountain, on the Cork boundary, to Carrigfoyle on the Shannon, 54½ statute miles; and the greatest breadth in a direct line east and west is from the Cork boundary at Lisheen to Dunmore Head, the most westerly point of the mainland of Ireland, 56 statute miles. In a direct line from south-west to north-east, between Bolus Head and the Limerick boundary at Tarbert, the distance is 69 miles. The coast line with its various indentations is above 220 miles. The area, as estimated in the above map, is 1,068,480 statute acres, or 1669 square statute miles. It has been elsewhere estimated at 1,148,720 acres, of which 581,189 acres are cultivated land, 552,862 are unprofitable mountain and bog, and 14,669 are under water. In 1831 the gross population was 263,126.

Kerry, with a small portion of Cork, forms the south-western extremity of Ireland. The coast, which is bordered by the Atlantic, is deeply indented by the æstuary of the Kenmare river, the bay of Dingle, and the bay of Tralee, the two former of which penetrate into the mainland about 30 miles in an easterly direction.

The peninsulas intercepted between these arms of the sea are occupied by the western extremities of the mountain system, which, commencing in Waterford, extends with little interruption across the entire south of Ireland. The mountains of Bear and Bantry, spreading from the south-western boundary of Cork across the south of Kerry, occupy the district between the river of Kenmare and the bay of Dingle. The peninsula intercepted between the bays of Dingle and Tralee consists in like manner of a prolongation of the mountain groups which occupy the north-western extremity of Cork and the south-west of Limerick: the heights connecting the extremities of this latter series of elevations extend across the middle of the county in a line nearly east and west. Between the above-mentioned mountain-ranges there is a considerable plain, formed by the subsidence of the high table-land, which occupies the middle portion of the Cork boundary, and spreads with a gradual declivity towards the head of Dingle or Castlemain Bay. Beyond the range of mountain which crosses the centre of the county extends a rich and generally level country, which rises into rough land in only one direction, towards Kerry Head on the Shannon.

At the head of the river Kenmare, which is in fact an arm of the sea, is a long and narrow valley, which is watered by the Roughty, the most considerable stream that falls into the Kenmare æstuary. The town of Kenmare is situated at the lower extremity of this valley in a fertile but confined tract, from which the Glancrought mountains rise on one side towards Cork, and the group of Mangerton on the other, towards that extensive mountain-tract which occupies the entire peninsula between the northern shore of Kenmare river and the bay of Dingle.

The extremity of this great peninsula, comprising the barony of Iveragh and part of the barony of Dunkerron, is divided into three principal valleys by ridges running nearly north-east by south-west. Of these valleys the first towards the north is separated from the bay of Dingle by a steep range terminating towards the head of the bay in the mountain of Drung, and prolonged westward to the coast at Dowlus Head, opposite to which the island of Valentia, half a mile from the opening of the valley, includes between it and the mainland one of the safest harbours in Ireland. The town of Cahirciveen is situated at the foot of this valley, where the river Fartagh expands into a small lake before falling into Valentia Harbour. Separated from the valley of the Fartagh by a ridge of the same mountain-group is another valley terminating towards the sea in the open bay of Ballinaskelligs, so called from the Skelligs, two remarkable rocks in the offing. The boundary of the bay of Ballinaskelligs on the north is Bolus Head, the extremity of the mountain-range above mentioned. Between this range and the Dunkerron mountains, on the south-east and east, then is a considerable extent of comparatively open country, subdivided into two valleys by the secondary ridge of Cahirbarna. Of these valleys that to the west is drained by the Inny, which has its sources about 20 miles in the interior at a great elevation, among the Iveragh mountains. On the opposite side of Cahirbarna lie three lakes, of which Loch Currane is the most considerable: it is supposed at one time to have been an arm of the sea, and, owing to an accumulation of detritus at its mouth, to have been converted into a basin for the waters descending from the lakes above. The village of Waterville is situated at the point where it discharges itself into the sea. The southern boundary of the bay of Ballinaskelligs is formed by the extremity of the Dunkerron range, which terminates in lofty mountains above Derrynane, from which point their general direction is north-east, nearly parallel to the northern shore of the æstuary of Kenmare. Between the main range and the shore of this arm of the sea there are numerous lateral valleys drained by mountain streams running nearly north and south. Of these the principal are the valleys of Sneem and the little Blackwater. Throughout this district the only spots of cultivated ground are either on the sea-coast, the banks of rivers, or along the upper margins of the bogs which universally occupy the valleys to a considerable height up the acclivities of the mountains. In the barony of Iveragh alone are 26,896 Irish, or 43,599 statute acres of bog, among which the several mountain-chains appear insulated.

The Iveragh mountains are bounded on the north-east by by the lateral valley of Glencare, which runs southward from the upper end of Dingle Bay towards the head of the similarly situated valley of Sneem, on the opposite side of the peninsula. Loch Carra, a considerable expanse of water, occupies the lower portion of the valley of Glencare, above which, in the recesses of the mountain, are the villages of Blackstones and Carramore. In the interior and opposite the extremity of the central ridge of Iveragh, is situated the great group of MacGillicuddy's Reeks, among which Carran Tual rises to the height of 3410 feet, being the highest ground in Ireland. The Reeks extend about ten miles in a direction from north-west to south-east, subsiding into the plain at the head of Dingle Bay on the north, and separated from the external range of Tomies and Glenà by a deep chasm called the Gap of Dunloe, on the north-east. In a deep hollow between the south eastern flank of this range and the group of Mangerton, which connects the extremity of the Dunkerron chain with the Priest's-leap and Glanerought mountains, lies the Upper Lake of Killarney. This beautiful sheet of water, which is three miles in length by three-quarters of a mile in breadth, is enclosed on all sides by mountains from 2000 to 3000 feet in height, except at one point, towards its eastern extremity, where it discharges its waters by a tortuous course of three miles between the southern declivities of Glenà and the precipitous side of Turk mountain, which forms a portion of the group of Mangerton.

There are several wooded islands in the Upper Lake, the luxuriant foliage of which forms an agreeable contrast to the general sterility of the surrounding mountains. There is however a considerable tract of natural oak forest towards its southern extremity, and the channel leading to the Lower Lake passes through a thickly wooded defile About midway between the extremities of the channel a remarkable detached rock, called the Eagle's Nest, rises over the left bank to a height of 1100 feet: the echoes here are of unusual continuance and distinctness. Emerging from this defile, the river expands into the Lower Lake of Killarney, seven miles in length by three in breadth, skirting the eastern declivities of the mountain range of Tomies and Glenà. These mountains, descending abruptly to the western verge of the lake, are clothed with the richest natural woods of oak, ash, pine, alder, and beech, intermixed with hazel, whitethorn, yew, holly, and arbutus, from a height of several hundred feet down to the water's edge through a continuous distance of six miles. O'Sullivan's river, descending by a thickly wooded ravine on this side, forms a cascade 70 feet high close to the shore of the lake. On the opposite side the low alluvial banks are everywhere broken into promontories and islands, on which the arbutus grows with uncommon luxuriance. The town of Killarney is situated on the plain about a mile from the eastern shore; half a mile south of Killarney runs the Flesk, the chief feeder of the lake. About a mile south from the embouchure of the Flesk, the richly wooded promontory of Muckruss, running into the lake about a mile and three-quarters, separates a portion of the lake which is called the Lake of Muckreefs, and sometimes Turk Lake, from its skirting the base of that mountain. Two cascades descend into Turk Lake: of these the more considerable is fed by a pool called the Devil's Punchbowl, situated at a height of 1700 feet on the ascent of Mangerton mountain, which, between the vale of Killarney and the town of Kenmare, rises

to a height of 2550 feet. The castles of Dunlo and Ross, and the ruined churches of Aghadoe and Muckreefs, which are all situated on the eastern shore of the Lower Lake, add considerably to the interest and extent of the surrounding scenery. The waters of the lakes of Killarney discharge themselves at the northern extremity of the Lower Lake through the river Laune, which runs by a course of twelve miles into the head of Dingle Bay.

The remainder of the plain between Killarney and the mountains south of Tralee is drained by the river Main, which rises near the Cork boundary, and after passing the towns of Castle Island and Castlemain, discharges itself into the head of Dingle Bay, where it forms an æstuary called Castlemain Harbour.

The valley of the Main is bounded on the north by the group of the Stack mountains, which sink into comparatively low hills as they trend towards the sea, leaving a pretty open communication with Tralee from the south. Westward from this point the lofty ridge of Slievemish occupies the entire neck of the peninsula of Corkaguinny, which bounds the bay of Dingle on the north. Slievemish is interrupted by a lateral valley, beyond which the conical mountain of Cahirconree rises to a height of 2784 feet. Westward from this a minor chain of hills extends to Dingle on the southern side of the peninsula; beyond and north of Dingle the mountains rise towards the Atlantic in great masses, of which the chief is Brandon, 3150 feet in height, being the second highest ground in Ireland. The extremity of the peninsula has an abrupt coast of about six miles from north to south, formed by Sybil Head, Maran mountain, Eagle mountain, and Dunmore Head, off which lie the Blasquet Islands.

North of Tralee the country improves in facility of access and cultivation. The plain of Ardfert, between Tralee and the high ground towards Kerry Head, is rich and well improved; its drainage is towards the sea, and the streams are insignificant. The remaining district, extending from the plain of Ardfert to Tarbert on the Limerick boundary, is the most extensive tract of open country in Kerry; it is drained by the rivers Feale, Gale, and Brick, which, uniting within five miles of the sea, receive the common name of the Cashen river: the united length of their courses is about 50 miles. A rough district extends from the mouth of the Cashen to Beal Point, where the æstuary of the Shannon first assumes the character of a river. The coast is here precipitous towards the sea, and near the bathing village of Ballybunion abounds in caves which are said to be of the most magnificent description. On the Feale is situated the town of Listowel, which, with Lixnaw near the Brick, and Tarbert and Ballylongford on the Shannon, are the only other places of consequence in the county. The district of the Cashen contains a large extent of bog. The total area of the bogs of Kerry is estimated at 150,000 acres.

The harbours on the south side of the river of Kenmare are in general badly protected from westerly and northerly gales. From Dutch Island, which fronts the harbour of Ardgroom on this side, as far up as the tide runs, there is safe anchorage in eight to three fathoms water in the middle of the channel, the banks being a soft ooze on which vessels may be conveniently careened. Opposite to Ardgroom, on the north side of the æstuary, is Sneem Harbour, where vessels may lie landlocked in four fathoms water, or in the entrance may ride in ten fathoms. Vessels parting their cables in any part of the æstuary may safely run aground in Nideen Sound, which forms the upper extremity of the bay on this side. Towards the middle of the west side of Ballinaskellys Bay is a small island, between which and the mainland is anchorage in four to five fathoms, but even here in hard weather a vessel requires very strong cables; the remainder of the bay is quite unsafe in southerly or westerly winds. Between Bolus Head and Puffin Island is St. Finian's Bay, which is very much exposed to the prevalent run of the sea. The harbour of Valentia opens about a league to the north of Puffin Island; it possesses the advantage of a double entrance, so that ships may sail in or out with any wind. It is quite landlocked, but the entrances are narrow, that on the north being contracted by the islands of Beginnis and Lamb's Island, between the former of which and Valentia there is a sunken rock, which farther contracts the entrance to a cable's length. Valentia Island forms the southern boundary of the bay of Dingle towards the sea. Dingle bay is open and unsafe, being full of shoals at its upper extremity; vessels embayed here should make either for Valencia or the creek of Dingle on the opposite side of the æstuary. [DINGLE.] A league west of Dingle creek is the bay of Ventry, with good anchorage and a sufficient depth of water, but open to the south. Smerwick harbour on the opposite side of the peninsula has also deep water and good holding-ground, but is exposed to the north: the bottom of the harbour consists of turf bog, which shows that a portion of this coast must have been submerged within a comparatively recent date. Under the neck of the peninsula on the northern side is the bay of Tralee, which is dry at low water, but now in process of considerable improvement by the construction of a ship canal, by which vessels of 300 tons will be able to come up to the town. [TRALEE.] From Tralee northward the coast is low and encumbered with shoals and sandbanks. Vessels embayed here, if they cannot make Fenit Creek on the north of Tralee Bay, have no shelter for a distance of two leagues. Beyond Kerry Head opens the æstuary of the Shannon, in which the first sheltered anchorage is off the point of Tarbert, where ships may lie nearly landlocked in twelve fathoms water. There are piers for fishing boats and small craft at Kenmare, Ballinaskelligs, Cahirciveen, Brandon, and Barra; and considerable improvements are projected at Ballylongford and Tarbert.

The roads in the south-western part of Kerry up to the year 1820 were scarcely passable for wheel-carriages, and there are some parts of the coast between Kenmare and Cahirciveen still inaccessible, except on foot or horseback. From Cahirciveen the old line of communication was by the seaward side of Drung Mountain, at a height of 800 feet above the Bay of Dingle. The difficulty of access to the district of Glanlehy situated southward of this line induced the proprietor, Lord Headly, in 1807, to commence the construction of a road on a more eligible level through his property: the development of the resources of the district which followed the first opening of this road was remarkably rapid; and the same result in a more striking manner attended the subsequent construction of a mail-coach road, connecting Cahirciveen, by the valley south of Drung Mountain, with the low country at the head of Dingle Bay. In three years from the opening of the new road in 1821, there were upwards of twenty two-story slated houses built in Cahirciveen, together with an inn, a bridewell, a post-office, a chapel, a quay, a salt-work, and two large stores for grain. Before this time the village consisted of a few thatched cabins, and the nearest post-office was thirty miles distant. About the same time government commenced several new lines of road, which have since greatly contributed to the prosperity of the country. Of these the most important is a line 25 Irish or 32 statute miles in length, connecting the town of Listowel and the northern parts of Kerry with Newmarket in the county of Cork, by which the distance from the former town to Cork city is diminished 29 miles. Another line 25½ statute miles in length connects Castle Island with Newcastle in the county of Limerick, diminishing the former distance from Killarney and the southern parts of Kerry to Limerick city 29½ statute miles. The old roads in this direction had in some places a rise of 1 foot in 4; the present road has a maximum rise of 1 foot in 27½. It crosses the Feale River by one arch of 70 feet span, where formerly was a bridge of twenty-one arches. Before the year 1824 there was no road passable for wheel-carriages between Kenmare and the south-western part of Cork, and the car-road from Kenmare to Killarney was of the worst description. An excellent road has since been constructed between the two latter places, and the line across the mountains of Bear and Bantry is now in progress. These lines will be united at Kenmare by a suspension-bridge, to which the Marquis of Lansdowne contributes 3200*l.* This will complete a direct and very important line of communication between the Shannon at Tarbert, and the south coast of the county of Cork near Skibbereen, a total distance of 84 miles. The other roads of the county are constructed and kept in repair by grand jury presentments.

The climate is very moist from the vicinity of the Atlantic, and the south-western district is much exposed to storms. In the inland parts however, especially in the neighbourhood of Killarney, the air is mild and genial, and vegetation extremely luxuriant. There have been some remarkable instances of longevity in this county, notwithstanding the prevalent use of ardent spirits.

The geological structure of the chief mountain-chains is similar to that of the mountains in the west of

Cork, the main component being a red or grey conglomerate and sandstone supporting flanks of silicious flags, and overlaid in the low districts by fields of floetz limestone. It is observed, that the arms of the sea which penetrate this county lie within the limestone troughs, that rock appearing at the upper extremity of each, while the promontories forming their sides consist of sandstone and conglomerate. The chief limestone fields occupy the basins of the Feale, Main, and Roughty, which last runs into the head of the æstuary of Kenmare. At the Roughty it is cream-coloured, hard, slaty, and has a vitreous fracture. Along the Main it lies in strata, generally compact, much impressed with marine remains, and towards Tralee is black and dressed as marble; it is of a lighter colour and softer in the direction of Castle Island, where it burns readily for manure. From Ardfert to Listowel, and thence north to Knockanure Hill, it is of a light smoke-colour, and rises occasionally in low crags from which it is procured with great facility. Northward from Ardfert the country towards Kerry Head consists of thick beds of argillaceous sandstone, beyond which the limestone reappears in contact with beds of alum slate in the cliffs of Ballybunion. This formation, which is the most extensive at present known, extends from Ballybunion to Baltard Point in the county of Clare, a distance of 30 miles. From Tralee eastward the country rising towards the boundaries of Cork and Limerick is occupied with an extension of the great Munster coal district. The upper strata of this tract consist chiefly of an indurated clay and has with ochreous partings covering thin beds of anthraceolite or culm: those on the eastern extremity of the district have been found alternating with good coal-blende similar to that of Kilkenny, and have been wrought to a considerable extent, but not in this county.

The mountains of Glanbehy abound with iron-ore, which was formerly smelted in considerable quantities at Blackstones, in works erected by Sir William Petty, but, the supply of timber having failed, these works were given up about the year 1750. An iron bloomery was also worked at one time at Killarney, the neighbourhood of which, as appears by some verses in Nennius, has been celebrated for its mines since the ninth century. At Muckruss and Ross Island in the Lower Lake, copper-mines have been worked occasionally since about the year 1750, but are now discontinued. Lead-ore has also been found in considerable quantities in the vicinity of the lake. Copper-ore has been found at Ardfert and in Glanerought. Works for extracting copperas were at one time in operation near Castle Island, but are now given up. The slate quarry in Valentia, the working of which is carried on by the Knight of Kerry, produces flags to the amount of 1800*l.*, and slates to the amount of 500*l.* annually. The flagging, which is of a very superior description, is bought at the quarries by a stone-merchant, who transports it to London, where there is a demand for it which, it is expected, will be limited only by the power of production. In size, appearance, and strength, these flags surpass every other description of flagging in use in London.

The soil of the south-western district, where not encumbered with bogs, is an adhesive loam, fit for the reception of corn crops, and formed by the decomposition of the clay-slate rock, which, from the nearly vertical position of its strata, is readily disintegrated by the weather. Up to the year 1810 the plough was totally unknown in the more western parts of this district, and spade cultivation is still practised to a considerable extent. The improvements on the estates of Lord Headly and the Marquis of Lansdowne have latterly given an impetus to agricultural labour throughout the southern parts of the county, which has caused a marked alteration for the better in the farms and dwellings of the peasantry. The soil of the middle district is a rich loam, which produces excellent crops of grain, and when laid down in pasture yields butter of prime quality. The northern district has a stiffer soil, more retentive of wet, and inclined to run to rushes. It also is grazed to a considerable extent by dairy farmers, who find a market for their butter in Tralee. Cider is made here in large quantities, and of a superior quality. The condition of the peasantry however is inferior to that of the inhabitants of the southern districts. The average rate of labourers' wages in the south is 8*d.* per day, and in the northern parts from 6*d.* to 8*d.* The system of farming, except where the example of the great proprietors has caused some change in the rotation of crops, is not judicious. Green crops are generally unknown, and grass seeds are little in use. The native breed of cattle are very small, but well formed, good milkers, and easily fattened. They are now chiefly met with in the mountain districts: the dairy farms and low pastures are stocked with the ordinary cattle of the country. A breed of small ponies is peculiar to Kerry; they are too light for farming purposes, but answer for the saddle very well, and are sold in considerable numbers throughout the country. The peasantry of the southern districts are distinguished by the darkness of their complexion, and a peculiar cast of features which has been generally thought to indicate a Spanish origin.

The chief trade of the county consists in exports of agricultural produce, chiefly oats and butter. The returns are defective, but it is estimated that 100,000 firkins of butter are annually sold in the markets of Tralee and Killarney. The manufacture of linen is carried on with some activity in the neighbourhood of Dingle, the linens from which place were formerly in much repute. There is also a general manufacture of coarse woollens throughout the county for home consumption.

In 1836 the fisheries on this coast gave occasional employment to 1 decked boat, 44 half-decked boats, 421 open sail-boats and 610 open row-boats, manned by 6311 fishermen. The condition of the fishermen has been gradually declining for the last thirty years: many of the men have emigrated and left their families mendicants. The fish caught are turbot, haddock, gurnet, pollock, plaice, soles, dorees, mullet, mackerel, herrings, pilchards, &c., with a plentiful supply of oysters, crabs, lobsters, and scallops. Great numbers of seals formerly frequented the river of Kenmare and the caves of Ballybunion; but they have latterly become more shy, and are now rarely caught.

Kerry is divided into the baronies of Iveragh on the south-west, containing the town of Cahirciveen, population (in 1831) 1192: Dunkerron, occupying the remainder of the peninsula, containing only hamlets: Glanerought on the south-east, containing the town of Kenmare, pop. 1072: Magonihy, in the centre, containing the town of Killarney, pop. 7910: Trughenacmy, north of Magonihy, containing the borough of Tralee, pop. 9568; and the towns of Castle Island, pop. 1570; Miltown, pop. 1429; Killorglan, pop. 896; Blennerville, pop. 532; Castlemain, pop. 387: Corkaguiney, occupying the peninsula between Dingle and Tralee bays, containing the towns of Dingle, pop. 4327; Castle Gregory, pop. 970; and Stradbally, pop. 425: Clanmaurice on the north-west, containing the town of Ardfert, pop. 717: and Iraghticonnor on the north and north-east, containing the towns of Listowell, pop. 2289; Ballylongford, pop. 1300; and Tarbert, pop. 956.

Prior to the Union, Kerry sent eight members to the Irish parliament: two for the county, and two for each of the boroughs of Tralee, Dingle, and Ardfert. It is represented in the Imperial parliament by two county members, and one for Tralee borough. The county constituency in 1836 was 1212. The assizes are held at Tralee, and quarter-sessions at Tralee and Killarney; there are bridewells at

Table of Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft	Families not comprised in two preceding classes	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	19,395	..	..	..	..	..	..	107,000
1813	Under Act of 1812 . . .	31,749	..	..	..	..	..	..	178,622
1821	Under Act 55 Geo. III. c. 120	35,597	38,059	..	..	..	108,617	107,568	216,185
1831	Under Act 1 Will. IV. c. 19 .	41,294	45,024	34,043	4,621	6,360	131,696	131,430	263,126

Killarney, Dingle, Kenmare, Cahirciveen, Castle Island, Miltown, Listowell, and Tarbert. The total numbers of persons committed for trial to the county goal in 1836 was 747, of whom 503 were convicted. Of the offenders, at the time of their commitment, 283 males and 3 females could read and write, 123 males and 8 females could read only, and 243 males and 87 females could neither read nor write. The constabulary force in 1835 consisted of 7 first class constables, 26 constables, 130 sub-constables, and 11 horse; the total cost of the establishment for that year was 5818*l.* 5*s.* 8*d.*, of which 2830*l.* 5*s.* 3*d.* was chargeable against the county. The county infirmary and fever hospital are at Tralee; there is also a fever hospital at Killarney, and there are dispensaries, supported by voluntary contributions and grand jury presentments, in all the minor towns. The district lunatic asylum is at Limerick; the proportion of the cost of its erection chargeable against Kerry county is 9303*l.* 16*s.* 7*d.* Kerry is entirely within the diocese of Ardfert and Aghadoe. The proportion of Roman Catholics to Protestants in this diocese is nearly 40 to 1. The proportion per cent. of the population under daily instruction is 4·63, in which respect this diocese stands last among the 32 dioceses of Ireland. There is however a very general turn for classical learning among the peasantry, many of whom have a tolerable knowledge of the Latin language.

Kerry, according to some Irish writers, had its name from Ciar, the son of Fergus, king of Ulster, and signified Ciar's kingdom; and originally formed part of the kingdom of Desmond, or South Munster, of which the Mac Carthies were sovereigns. Dermod MacCarthy, chief of this country, having invited the assistance of Raymond le Gros, one of the early Anglo-Norman adventurers, to suppress the rebellion of his son Cormac, granted him as a recompense for his services a large tract in the north of the county round Lixnaw, where Raymond, about A.D. 1177, settled his son Maurice, from whom the Fitzmaurices, lords of Kerry, draw their pedigree, and the barony of Clanmaurice takes its name. Soon after, the Fitzgeralds established themselves in the south of the county, where they rose to such power on the downfall of the MacCarthies that in 1295 Thomas Fitzmaurice Fitzgerald was captain of all Desmond, comprising the counties of Cork, Waterford, and Kerry, and lord justice of Ireland. He left two sons, John, afterwards created earl of Kildare, and Maurice, created earl of Desmond, with a royal jurisdiction over the palatinate of Kerry, A.D. 1329. The liberty of Kerry so erected included the entire county, with the exception of the church lands, for which the king appointed the sheriff. The lords of the palatinate had their own courts, judges, and great law officers, the only distinction between the liberty and a regular county being that the executive was administered by a seneschal instead of a sheriff. The possession of so great powers in a district removed from all direct control drew the succeeding earls of Desmond into frequent contempts of the royal authority, for which their territories were on several occasions wasted by the king's forces. The rebellion of Gerald, the sixteenth earl in the reign of Elizabeth [CORK], caused the final suppression of their authority and confiscation of their estates. The English knights and gentlemen who had grants from the queen of the forfeited lands in the county were—Sir William Herbert, Knt., 13,276 acres; Charles Herbert, Esq., 3768 acres; Sir Valentine Brown, Knt., 6560 acres; Sir Edward Denny, Knt., 6000 acres; Captain Conway, 5260 acres; John Chapman, Esq., 1434 acres; and John Holly, Esq., 4422 acres.

On the breaking out of the rebellion of 1641, the native Irish again took arms, and laid siege to the castle of Tralee, to which a great number of English families had fled. After a siege of six months the place surrendered, and the Irish remained in possession of the country till 1652, when Ludlow, with an army of 4000 foot and 200 horse, again reduced them. Extensive confiscations of the estates of the native Irish followed. Among the new proprietors was Sir William Petty, who obtained a large grant of lands in the neighbourhood of Kenmare, and commenced the smelting of iron, which was carried on with vigour while timber lasted. A colony of Protestants was planted by Sir William Petty round the head of Kenmare river, who were attacked by the native Irish in 1688, and compelled to abandon their possessions. A detachment of King William's army, under Brigadier Levison, entered the county in 1691 and finally reduced it. The confiscations consequent on the last rebellion amounted to 90,116 acres, of an estimated total value at that time of 47,483*l.* 12*s.* 9*d.* About 1710 the coast was harassed by French pirates, which led to the erection of a small fort on Valentia Island. The principal proprietors at present are, the Marquis of Lansdowne, in whom the Fitzmaurice and Petty estates centre; Lord Kenmare, the representative of the Brown family; Lord Headly, Lord Ventry, and the Knight of Kerry.

Kerry contains several monuments of a very remote antiquity, of which the most remarkable are the Cyclopean stone fortresses of Cahirconree, Staigue, and Cahir Donnell; and the sepulchral stones with ogham inscriptions in the neighbourhood of Dingle. Stone cells, probably of the sixth and seventh centuries, are still standing on the greater Scellig Island, at Ventry, and at Smerwick. There is a round tower at Rattoo, one in an island in Loch Currane, part of another at Aghadoe, and a fourth formerly stood near the cathedral of Ardfort. There are also the remains of thirteen religious houses and thirty feudal castles.

The county expenses are defrayed by grand jury presentments. The amount in 1835 was 30,951*l.* 4*s.* 7½*d.*, of which 19,672*l.* was for public roads, buildings, institutions, and other general county charges, and 11,279*l.* 4*s.* 7*d.* for roads charged specially to the several baronies.

(Smith's *Ancient and present State of the County of Kerry*, Dublin, 1756; *Report of the Irish Bog Commissioners*, 1811; *Transactions of the Dublin Geological Society*, vol. 1, part iv., 1838; Ainsworth's *Account of the Caves of Ballybunion*, Dublin, 1834; *Guide to Killarney*, Dublin, 1835; *Parliamentary Reports, Papers*, &c.)

KERSEY, KERSEYMERE. [WOOLLEN MANUFACTURES.]

KERTSCH. [CRIMEA.]

KESTEVEN. [LINCOLNSHIRE.]

KESTREL, or KESTRIL, the English name of the *Falco tinnunculus* of Linnæus, *Cresserelle* of the French, *Falchetto di Torre* of the Italians, *Cudyll côch* of the antient British. [FALCONIDÆ, vol. x., p. 182.]

KESWICK. [CUMBERLAND.]

KETCHUP. [MUSHROOMS.]

KETTERING. [NORTHAMPTONSHIRE.]

KETUPA. [OWLS.]

KEUPER, in geology, the German term for the upper portion of the new red sandstone formation. It is supposed by some geologists that certain sandstones in Warwickshire, Worcestershire, and other parts of England, correspond to this group of strata. Remains of reptiles are said to have been found in it near Warwick.

KEVEL. [ANTELOPE, vol. ii., p. 83.]

KEW. [SURREY.]

KEY, in music, is the particular diatonic scale, whether major or minor, in which a composition begins and ends, and which more or less prevails in a given piece of music.

The diatonic scale may commence on any note, and that chosen—called the *Key-Note*—governs the progression of the other notes. [SCALE. DIATONIC.] If a composition begins and ends in a scale in which neither sharps nor flats are used, it is in the key of C, the distinctive term *natural* being understood. When three flats are placed at the clef, and the last and lowest note in the piece is E♭, the key is E♭. If in such case the last and lowest note is C, the key is C minor, &c.

As any note in the diatonic and chromatic scales may be taken as a key-note, it follows that there are twelve keys in the major mode, and twelve in the minor; for each scale may have either a major or a minor 3rd. [MAJOR. MINOR.] Hence arise twenty-four keys. But as three major and consequently three minor keys are binominous, there are in name thirty different keys, and as many signatures are in actual use [SIGNATURE]; though, in fact, there is only the before-mentioned number of keys differing in reality.

TABLE OF MAJOR KEYS.
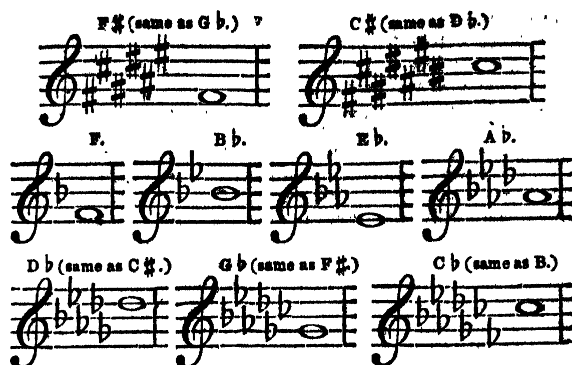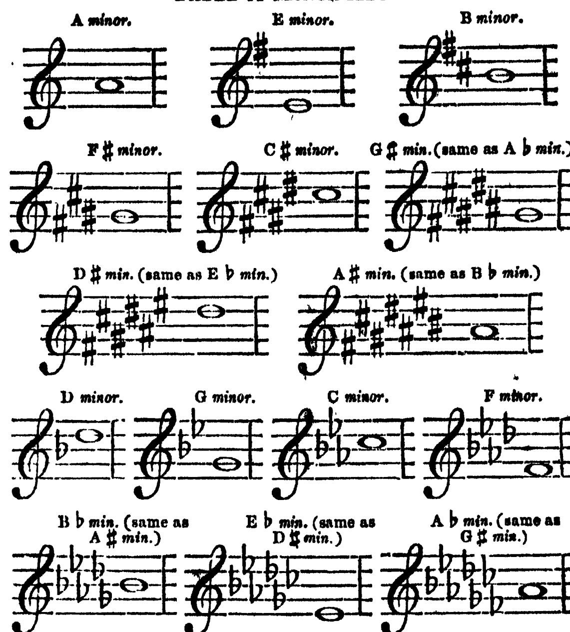
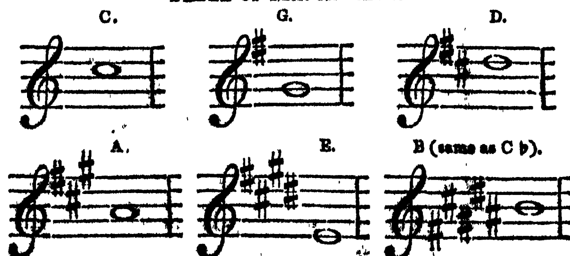




Table of Minor Keys.



By admitting double sharps and flats, the number of keys may be much farther, but not usefully, extended.

KHALIF. [Caliph.]

KHAIR EDDIN. [Barbarossa, Khair Eddin.]

KHAN, a word of Mongol or Turkish extraction, said to mean 'great and powerful lord,' was employed by the nations of central Asia to express the full extent of royal power. This title was assumed by Gengis when he became supreme ruler of the Mongols and Tartars, and was adopted by all his successors. The earlier monarchs of the Ottoman empire were also distinguished by this title. The word is used in Persia in a much more restricted sense, and is applied to the governors of provinces, and to all officers of a certain rank.

The original form of this word was *Khaghan;* Gengis Khan is always called Jinggis Khaghan in the Mongol language. (*Geschichte der Ost-Mongolen*, by Schmidt, Petersb., 1829.)

KHAYA, a genus of plants of the natural family of Cedrelaceæ, which is often made a tribe of the Meliaceæ. Khaya contains only a single species, *K. Senegalensis*, which has been well figured in the 'Flore de Senegambie,' i. t., 32. It forms one of the largest and handsomest of the trees which are found along the banks of the Gambia and in the valleys near Cape Verd. It attains a height of from 80 to 100 feet, and is also one of the most common of the trees of the forest, being called *Cail* by the negroes, and *Cail-cedra* by Europeans. The wood is of fine quality, reddish coloured like the mahogany, which belongs to the same natural family. The bark is remarkable for its bitterness and febrifuge properties, and is taken by the negroes in the form of infusion and decoction, as a cure for the fevers so prevalent in their country.

KHEMNITZER, IVAN IVANOVITCH, an admired Russian fabulist, was born in 1774, at St. Petersburg, where his father, who was a native of Saxony, held the appointment of physician at one of the hospitals. His aversion to medical and anatomical studies determined him to enter the army in preference to following the profession chosen for him; but after serving in two campaigns against the Prussians and Turks, he determined to serve in the army only as a military engineer, in which capacity he quickly won the regard of his superiors. In 1784 he was appointed consul-general at Smyrna, but had hardly arrived there when he died (March 20). Although his Fables reached a second edition in his lifetime, they did not attract much notice until a complete edition of all his pieces appeared in three volumes in 1799, with a memoir of the author and his name, which last had not been previously given to the public. Since then they have been reprinted several times, and have acquired very great popularity.

KHERASKOV, MICHAEL MATVIEVITCH, born October 25, 1733, was a Russian poet of considerable celebrity in the last century, although his reputation has since declined. His epic poem in twelve cantos, entitled the 'Rossiada,' which first appeared in 1785, celebrates the liberation of Russia from the yoke of the Tartars in the reign of Ivan Vassilievitch. Although hardly rising to the dignity of an epic, this production possesses much interest of narrative, and several very striking scenes and descriptions. 'Vladimir,' his second poem of the same class, is in eighteen cantos, and was first published in 1786. Besides these he wrote numerous other works, both in prose and verse, including an imitation of Corneille's 'Cid,' and some other tragedies and dramatic pieces. He died September 27, 1807, aged 74.

KHERSON (*Cherson*, or *Nikolajeff*), a government of European Russia, lies between 46° 12′ and 49° 4′ N. lat., and 29° 10′ and 35° 5′ E. long. It is bounded on the north-west by Podolia, on the north by Kieff, on the north-east by Pultawa, on the east by Ekaterinoslaf, on the south-east by Taurida, on the south by the Black Sea, and on the west by Bessarabia. Its area, according to Hassel and Schubert (1835), is 25,347 square miles, others make it only 19,000; but Hörschelmann (1833) makes it 34,964 square miles.

Its extreme length from east to west is about 250 miles, and its breadth from north to south about 100 miles for one-third of the length from west to east, and for the other two-thirds almost 180 miles. The province, which consists of an immense plain, lies between the Dnieper and the Dniester. A branch of the Dnieper range traverses it for a short distance on the north-east, and on the south-west a small chain belonging to the outskirts of the Carpathians runs into the country from Podolia. It is only on the north-west and north-east borders that there is some wood, and in the neighbourhood of Elizabethgrad there are considerable forests. The rest of the country is a steppe, beginning at Mirgorod and extending across the whole province, where scarcely a tree is to be seen; the soil is however covered with a luxuriant vegetation of grasses and other plants. From February to May the grass grows to such a height that the sheep are quite lost in it. During the great heat the grass gradually withers, and vegetation does not revive till the autumn. In the interior the soil is a grey clay mixed with sand, which is not very well adapted to agriculture, but produces the richest pastures. Here and there are heaths, and in the lower parts swamps: on the coast there is a red ferruginous earth, which produces little besides saline plants.

The Black Sea washes the south of the province from the Dniester to the Dnieper. The principal rivers are the Dnieper and the Dniester, of which the latter forms the boundary between Kherson and Bessarabia. The course of the rivers in the whole province is exceedingly slow, and their water bad. There are very few wells of fresh water; as, for instance, in the whole of the great steppe of Oczakow, 8600 square miles in extent, there are only about a hundred springs of sweet water. The climate is very variable; in summer the heat is from 85° to 90° of Fahrenheit. A dark yellow sky, a wind which raises the dust in clouds, and an immense torrent of rain, are the usual precursors of a thunder-storm, which is awful beyond conception. The nights are always cool. The winter is very cold: most of the rivers freeze over, though but for a short time, and not always so much as to bear a man.

The ground, when by great labour it is cleared of the roots of the grass, and when the saltpetre, which generally appears when the surface is bare of vegetation, is got rid of, will pro-

duce from ten to twenty fold, even without manure, if after being cropped for five or six years it is suffered to lie fallow for an equal time. But the inhabitants dislike agriculture, and prefer the breeding of cattle, so that they never raise corn enough for their own consumption. Almost every two years swarms of locusts desolate the country, but they seldom come farther than Kherson, about seventy miles up the Dnieper. Hemp and flax are grown only for domestic consumption. Tobacco (some of the best in the empire), mustard, and saffron are articles of commerce. There are several varieties of the vine, and the wine has been much improved of late years. Horticulture is much more attended to than agriculture. The forests, as we have said, are confined to the north of the province, and to the vicinity of Elizabethgrad; the latter for a long time furnished almost all the timber required for building the Black Sea fleet, but they are now greatly thinned. The banks of the rivers, especially of the Dnieper, are covered with strong reeds, which are used both for thatch and for fuel. For want of wood, hardly any habitations are seen but thatched clay huts; many of the inhabitants dig for themselves habitations in the earth, choosing particularly the antient tumuli, with which the plain is covered. Of tame animals the most common is the sheep. The wool of the native breed is rather coarse, but of late years great numbers of Merinos have been imported, and there is no other province that has so many sheep of the improved breed. The three provinces of Ekaterinoslaf, Taurida, and Kherson have now 500,000 Merinos. Oxen and buffaloes are numerous, and used for draught; the horses (of which many are wild) are slight, but very spirited and swift-footed. Wild animals of all kinds abound, especially wolves and wild-cats, which last are formidable beasts of prey. The fields are covered with bustards, grey partridges, ortolans, snipes, &c. Besides locusts, the country is infested by large rats, which come from Taurida. There are great numbers of water and other snakes, scolopendræ, whose bite is as venomous as that of the Tarantula, incredible numbers of lizards, and swarms of gnats. The fisheries on the sea-coast and in rivers are very important. The minerals are, fine potter's clay, freestone, slate, chalk, talc, saltpetre, agates, and garnets. The manufactures are of little importance; some, however have been introduced into Kherson and Odessa. The province is most happily situated for trade. The foreign commerce of the country, which is very important and rapidly increasing, will be best described under Odessa, which, though founded only in 1796 by the Duke of Richelieu, is now the staple place for the commerce of all Southern Russia. [Odessa.]

The inhabitants, who are estimated at 607,000, consist of Great and Little Russians (among the latter are many Cossacks), Poles, Moldavians, Rascians, Bulgarians, Tartars, Greeks, Armenians, and Jews, all settled; even the Cossacks of the Bug have renounced their nomadic life, follow agriculture, and have fixed habitations. There are in this government 35,000 foreign colonists, chiefly German, in fifty-six colonies, possessing (in 1836) 284,942 dessatines (60,000 acres) of land. There are also a great many gypsies. The Greek Christians are under the archbishop of Ekaterinoslaf, Kherson, and Taurida, who resides at Ekaterinoslaf, where his cathedral is. In Kherson he has 367 parishes. [Cherson.]

KHORASSIN. [Persia.]

KHOSRU I., called Chosroes by the Greek writers, but most commonly known in the East by the name of Nushirwan, 'noble soul,' succeeded his father Kobad in the kingdom of Persia, A.D. 531. Kobad at the time of his death was engaged in a war with Justinian, the emperor of Constantinople; but Khosru, shortly after his accession, concluded a peace with Justinian, on the payment by the latter of 10,000 pounds of gold. Khosru diligently employed this interval of rest in regulating the internal affairs of his kingdom; the corrupt officers and magistrates, who had been appointed during the reign of his father, were removed; justice was impartially administered in every part of the empire; and the fanatical followers of Mazdak, who had obtained numerous proselytes to the inviting doctrine of a community of goods and women, were banished from his dominions. He divided the empire into the four great provinces of Assyria, Media, Persia, and Bactriana, and established a vizir over each; and he secured at the same time the stability of his throne by the murder of his two elder brothers. In the course of a few years he extended his dominions as far as the Indus, and compelled the nomadic hordes, who had taken possession of the northern provinces of the empire during the reign of his father, to repass the Oxus and withdraw to the central plains of Asia.

Though Khosru was successful in his wars with the people of Asia, he beheld with concern the conquests of Belisarius in Italy and Africa; and afraid lest Justinian should acquire sufficient power to attack the Persian dominions, he collected a large army, and, in violation of the truce that still subsisted, he invaded Syria in 540. His unexpected attack had given the Greeks no time for defence; the principal cities were plundered by the Persian troops, and Antioch, the capital, was taken after a short but vigorous resistance. On his return, Khosru founded, at one day's journey from Ctesiphon, a city, which he called Antioch Khosru, where he placed the numerous captives he had taken in his invasion of Syria. In the following year Belisarius was recalled to defend the East; and his superior military skill enabled him, with an army far inferior to the Persians both in discipline and numbers, to prevent Khosru from extending his conquests. In 542 Belisarius was recalled to Constantinople, and degraded from all his employments; and the generals who succeeded him were easily defeated by the Persian troops. The war continued to be carried on for many years, though with little vigour on either side, in the neighbourhood of the Black Sea, and principally in the territories of the Lagi, a Colchian people; till at length, after much delay and many negotiations, Khosru condescended to grant a peace to Justinian in 562, on the annual payment by the latter of 30,000 pieces of gold.

This peace however was only preserved for ten years. The lieutenants of Khosru had subdued the province of Yemen in Arabia, and compelled the Abyssinians, who had possessed the supreme authority for many years, to withdraw from the country. The Abyssinians were the allies of the emperors of Constantinople; and Justin, who had succeeded Justinian, having entered into an alliance with the Turks, collected a powerful army in order to avenge the cause of his allies. But his efforts were unsuccessful; his troops were everywhere defeated, and the province of Syria was again plundered by the Persian soldiers. Justin was obliged to resign the sovereignty, and his successor Tiberius obtained a truce of three years, which time was diligently employed by Tiberius in collecting an immense army from all parts of the empire. The command was given to Justinian; and a desperate battle was fought between the Greeks and Persians in the neighbourhood of Melitene, a town in the eastern part of Cappadocia, in which Khosru was completely defeated. He died in the spring of the following year, A.D. 579, after a reign of 48 years, and was succeeded by his son Hormisdas IV.

The virtues, and more particularly the justice, of this monarch form to the present day a favourite topic of Eastern panegyric; and the glories and happiness of his reign are frequently extolled by poets as the golden age of the Persian sovereignty. His reign forms an important epoch in the history of science and literature: he founded colleges and libraries in the principal towns of his dominions, and encouraged the translation of the most celebrated Greek and Sanskrit works into the Persian language. A physician at his court, of the name of Barzûyeh, is said to have brought into Persia a Pehlvi translation of those celebrated fables which are known under the name of Bidpai or Pilpay [Bidpai]; and it was from this translation of the Indian tales that these fables found their way to nearly every other nation of Western Asia and Europe. The conquests of Khosru were great and numerous; his empire extended from the shores of the Red Sea to the Indus; and the monarchs of India, China, and Tibet are represented by Oriental historians as sending ambassadors to his court with valuable presents to solicit his friendship and alliance. (See the original passage in Ewald's *Zeitschrift für die Kunde des Morgenlandes*, vol. i., p. 185.)

KHOSRU II., the grandson of Khosru I., was elevated to the throne of Persia, A.D. 590, on the deposition of his father Hormisdas by Bindoes, a noble of the royal blood. In the first year of his reign Khosru was obliged to leave his native country to escape from the treachery of Bahram, who rebelled against his sovereign and seized upon the royal power. Khosru took refuge in the dominions of Maurice, the emperor of Constantinople, who assisted the Persian monarch with a numerous army, with which he was

enabled to defeat Bahram, and again to obtain possession of the sovereignty. The friendship of Maurice was however purchased by the surrender of some of the most important towns of Mesopotamia and the payment of a large sum of money. During the life of Maurice, peace was preserved between the two nations; but on his assassination by Phocas in 602, Khosru took up arms to revenge the death of his benefactor, and in the space of fourteen years subdued almost all the provinces of the Greek empire. In 611 Antioch was taken; in the following year Cæsarea, the capital of Cappadocia, fell into the hands of the Persians; in 614 the whole of Palestine was subdued; in 616 Egypt was conquered, and Alexandria taken by Khosru himself; while another Persian army subdued the whole of Asia Minor, and advanced as far as the Bosporus. The Roman empire was on the brink of ruin; the capture of Alexandria had deprived the inhabitants of Constantinople of their usual supply of corn; the northern barbarians ravaged the European provinces; while the powerful Persian army on the Bosporus was making preparations for the siege of the imperial city. Peace was earnestly solicited by Heraclius, who had succeeded Phocas in 610, but without success. Khosru however did not cross the Bosporus, and at length, in 621, he dictated the terms of an ignominious peace to the emperor. But Heraclius, who had hitherto made very few efforts for the defence of his dominions, rejected these terms; and in a series of brilliant campaigns (A.D. 622—627) recovered all the provinces he had lost, repeatedly defeated the Persian monarch, and advanced in his victorious career as far as the Tigris. Khosru was murdered in the spring of the following year, 628, by his son Siroes.

(Gibbon's *Decline and Fall;* Malcolm's *History of Persia;* D'Herbelot's *Bibliothèque Orientale.*)

KIACHTA is a place in Siberia, in the government of Irkutsk, 50° 20′ N. lat. and 121° 40′ E. long., south of the lake of Baikal, and in a sterile country, 2480 feet above the level of the sea, on a small stream also called the Kiachta. A considerable trade is carried on here, as it is the only place in which, according to agreement, the subjects of the empires of China and of Russia are permitted to exchange their merchandise. Kiachta consists of two separate parts; the fortress, called Troitsko Sawsk, where the custom-house, the imperial offices, and the military government are established, and the lower town, or Kiachta, which is nearly two miles farther south, and where the merchants live. Kiachta has one bridge, a square, one wooden church, two chapels, and thirty-seven houses, mostly belonging to merchants, elegantly built, and kept in good order. There are only 321 inhabitants (200 men, 121 women). Troitsko Sawsk contains 4541 inhabitants (2237 males, 2304 females); 648 houses, three churches, two chapels, two parish schools, attended by 105 scholars, and the Russo-Mongol School, supported at the expense of the Buriat Cossacks. Merchants from all parts of Russia have settled here—from Moscow, Kursk, Kasan, Vologda, Kaluga, Nishnei Novgorod, Tobolsk, and Irkutsk.

The commerce of this place with Maimaitchin, the Chinese emporium, which is less than a mile from the lower town, has only risen to importance in modern times. From 1727 it was conducted on account of the Russian government, and was of little importance; but in the last-mentioned year the trade was laid open to private merchants. At first it increased very slowly. In 1806 Klaproth estimated the value of all the goods sold by the Russian merchants at only eight millions of francs, or about 350,000*l.* But in 1821 Cochrane found that the profit of the merchants was equal to the value of the goods sold in 1806. The Russians bring to Kiachta furs, particularly those of the sable, black fox, and ermine; hides, woollen cloth, and other coarse woollen fabrics; glass, looking-glasses, and cattle. They receive in return from the Chinese, manufactured silks and cottons, tobacco, china, furniture, and several kinds of toys; but the principal commodity taken in exchange is tea. Cochrane estimated the quantity of tea imported in 1821 at three millions of pounds weight; and at the great fair of Nishnei Novgorod the value of the tea which was sold in 1823 amounted to twelve millions of paper roubles. The tea brought to the fair of Nishnei Novgorod in 1838 was 37,356 chests, being 5700 more than in 1837: the value was 17,399,500 roubles; to which must be added 560,000 roubles for the value of 5000 chests of tea pressed into cakes. Chinese silks and nankeen were brought only to the amount of 32,000 roubles. The value of the rouble is 10¼*d.*. The merchants of Kiachta and Maimaitchin live on a very friendly footing, and frequently meet in social parties, but only during the day; for no sooner has the tattoo beaten in Kiachta, and the fire-ball ascended from the residence of the *Sargatshei*, or governor, in Maimaitchin, than the gates of the towns are shut, and all communication between them is interrupted.

(Pallas, *Travels in Siberia*; Klaproth, *Mémoires relatifs à l'Asie;* Cochrane, *Pedestrian Journey*, &c.; Erman, *Annalen der Erdvölker und Staatskunde; Official Statements.*)

KIDDERMINSTER, a corporate town and parliamentary borough, in the hundred of Halfshire and county of Worcester. It is situated on the Stour, near the confluence of that river with the Severn; 124 miles north-west by north from London. According to Nash (*Hist. of Worcestershire*) the name of this place was antiently written *Chiderminster*, a term which has reference to the church on the brow of a hill and the water running beneath. At the time of the Conquest it was the king's property, and it remained with the crown until the reign of Henry II., who gave the manor to Manser, his favourite. At a subsequent period it became the property of Waller, the poet, by whom it was sold in 1643-4 in order to pay his fine to parliament on account of what was called Waller's plot. Kidderminster returned members to parliament as early as the 28 Edward I., but owing to disuse the privilege was afterwards lost. By the Reform Act it was again erected into a parliamentary borough, and now returns one member. The earliest charter of incorporation is that of 12 Charles I., but as it conferred upon the corporate body no power to acquire landed property, or to augment the number of magistrates, which was limited to two, they obtained from the crown in 1828 a new charter, which is now the governing charter, and bears date 7th August, 8 Geo. IV. The council consists of a mayor, six alderman, and eighteen councillors.

The town is well lighted, watched, and paved under the superintendence of commissioners appointed by a local act, and the expense is defrayed by a rate. The annual value of the real property of the borough in 1815 was estimated at 13,960*l.*; the assessed taxes in 1831 amounted to 1929*l.*, and the parochial assessments for the same year to 4586*l.* The prosperity of the town appears to be gradually increasing; it possesses considerable trade and a large manufacture of carpets. [CARPETS.] The church is a handsome Gothic structure surmounted by a fine tower: the interior contains many altar-tombs, brasses, and other antient monuments, for a particular description of which we refer the reader to Nash's *History of Worcestershire*, London, 1782, fol., ii., 48. The living is a vicarage in the patronage of Lord Foley, and has an average net income of 1107*l.* At the east end of the church is a Gothic chapel which was formerly, and we believe still is, appropriated to the use of the free grammar-school. This charity was founded prior to the charter of Charles I. The rental of the estates belonging to the school amounts to 491*l.* 19*s.* 1*d.* per annum, in addition to which there are two houses for the use of the upper and lower masters, erected in 1805 at an expense of 1800*l.* The school is divided into an upper and lower school, and the practice now is to take all boys who wish to learn Latin into the upper school. In the lower school the boys are instructed in reading, writing, and accounts, but not Latin. The salary of the upper master is 290*l.* and that of the under master 145*l.* per annum. Notwithstanding the ample endowment of this foundation, it has hitherto been of comparatively little advantage to the town. In 1835 there were but six boys in the upper school, and the average number that attended the lower school was only fifteen. Besides the free school there are several almshouses and other benevolent institutions. The population of the town in 1831 was 14,981, having been augmented by 4272 persons during the 20 years preceding, which is to be ascribed chiefly to the flourishing state of the manufactures during that period. The population of the parish is 20,865.

(Nash's *History of Worcestershire;* Carlisle's *Grammar Schools;* *Corporation Reports*, &c.)

KIDNAPPING is defined to be the stealing or conveying away of a man, woman, or child, and is an offence at common law, punishable by fine and imprisonment, and until the abolition of that mode of punishment by 1 Vict., c 23, by pillory The 9 Geo. IV., c. 21, which is directed

against child-stealing, enacts that if any person shall maliciously, by force or fraud, lead, or take away, or decoy or entice away, or detain, a child under the age of ten years, with intent to deprive its parents, or any other person having the lawful care of such child, of the possession of it, or with intent to steal any article upon or about the person of such child, to whomsoever such article may belong, or shall receive and harbour with any such intent as aforesaid any such child, knowing that it has been by force or fraud led, taken, decoyed, enticed away, or detained, every such offender, and their counsellors, procurers, aiders, and abettors, shall be guilty of felony, and shall be liable to be transported for seven years, or to be imprisoned, with or without hard labour, in the common gaol or house of correction, for any time not exceeding two years; and if a male, to be once, twice, or thrice publicly or privately whipped (if the court shall so think fit) in addition to such imprisonment.

The act does not extend to a person who shall have claimed to be the father of an illegitimate child, or to have any right to the possession of such a child, on account of his getting possession of such child, or taking it out of the possession of the child's mother or other person who has the lawful charge of it.

KIDNEYS are two glands lying in the lumbar region, on each side of the spinal column. They are composed of numberless and delicate tubular ramifications, on whose walls there is a fine network of capillary arteries and veins, and which are all collected into one mass of a firm fleshy consistence, enclosed in a fibrous capsule.

The ureter, through which the urine secreted by the kidney is conveyed to the bladder, dilates at its extremity into a wide pouch, the pelvis of the kidney, which is divided into several portions called calyces. Into each calyx a nipple-like process, or papilla, projects, at whose extremity there are several minute orifices, each opening into a very fine canal, which, as it is continued into the substance of the kidney, ramifies and becomes tortuous. On all these canals, or tubuli uriniferi, minute blood-vessels ramify, and secrete the urine, which is conveyed from the tubuli into the calyces, and from them through the pelvis and the ureter into the bladder.

The papillæ, and the conical bodies called pyramids, of which they are the extremities, being chiefly composed of the excretory canals, are nearly white, and of a firm dense structure; but as the tubuli ramify, their branches separate in a somewhat radiating manner, and the blood-vessels filling the intermediate spaces between them give to all the exterior part of the kidneys a deep red colour, and a softer and more fleshy consistence. Hence the kidney is generally described as divided into a cortical, or vascular, and a medullary or tubular portion.

The general structure of the kidney may be best shown by making a section from its convex border into the pelvis. The surface of each part then presents several whiteish conical bodies, the pyramids, whose rounded apices, the papillæ, project into corresponding tubular calyces, and whose bases are surrounded by the vascular cortical substance. In the latter no distinct arrangement of vessels can be seen, but there are scattered irregularly through it minute granular bodies called the acini, or corpuscles of Malpighi, which are composed of delicate tortuous arteries.

In the early embryo of mammalia each papilla, with the tubules opening on it and its blood-vessels, forms a separate body; but during growth the several renculi are united into one mass, their original separation being however indicated by the more or less deeply lobulated form of the organ in various animals, and occasionally in man.

KIDNEYS, DISEASES OF. The principal disease to which the kidneys are liable is that which gives rise to the formation of calculi. [CALCULUS, *Renal*.] Sometimes the stone is retained in the pelvis of the kidney, where, by continued depositions, it may increase till it completely fills the pelvis and calyces; but more frequently it passes through the ureters into the bladder, producing in its passage violent spasmodic pain in the loins, sickness and nausea, hæmorrhage, &c. This affection is the most common cause of inflammation of the kidneys (nephritis), from which abscess and other morbid alterations may result. Chronic inflammation seems to be the most frequent cause of a peculiar alteration in the structure of the kidneys particularly described by Dr. Bright ('Medical Reports'), of which the chief characters are, the interstitial deposition of a pale yellowish and firm substance, and a granular or tuberculated form of the surface of the kidney, with a great decrease of its vascularity. This condition is very common in hard drinkers; it usually produces dropsy, and is indicated by a dull heavy pain in the loins, a bloated expression of the countenance, a hard pulse, and the secretion of so large a quantity of albumen with the urine that it coagulates on being heated, or on the addition of a little bichloride of mercury.

Suppression of urine may be the ultimate result of obstruction from caculi in the ureters, or it may occur as an idiopathic disease. It is a condition of great danger, for low delirium and a comatose sleepy state very often supervene on it, and soon terminate fatally. Long and often repeated attacks of retention of urine from obstruction produce dilatation of the ureters and pelvis, which sometimes acquire an enormous size. There may result from the same cause a gradual absorption of the substance of the kidney, till in an advanced stage there is found nothing but a thin sac containing urine in a single cavity, or in a number of separate pouches. The kidneys are also subject, in common with other organs, to the deposition of various morbid substances, as cancer, fungus, hæmatodes, melanosis, tubercle, &c. But the diagnosis of all the chronic affections of this organ is extremely obscure, the principal indications of each being the same, viz. the dull heavy pain in the loins, dropsy, and sometimes hæmaturia.

KIEL, the capital of the duchy of Holstein, is situated in a beautiful part of the country, and on a bay of the Baltic, called the Kielerfiord, which forms an excellent harbour, and admits even large ships of war to anchor near the town: 54° 10′ N. lat., 10° 8′ E. long. It is surrounded with walls, in which there are five gates; and is pretty regularly built, with straight well-paved streets The university of Kiel was founded in 1665, by Christian Albert, duke of Holstein. Though the university has a library of 70,000 volumes, a revenue of 20,000 dollars, 19 regular and 10 extraordinary professors, and all the necessary appendages, the number of students is small, which is probably owing to the circumstance that living is very dear. The number has however increased of late years. The published annual accounts state that in 1818 there were 107 students, in 1825 about 390, in 1831 about 311, and in 1836 only 252, which is probably near the present amount. The inhabitants, amounting in 1837 to 11,791, including those of th village of Brunswyck, have some manufactures of linen hats, tobacco, sugar, &c., and some business in ship building. Their trade in corn, dried herrings, and sprats (which are celebrated) is considerable, and has much increased since the completion of the Holstein or Kiel Canal, which joins the Baltic and the German Ocean. [HOLSTEIN.] The most busy time of the year is at the annual fair on the three days after twelfth-day, which is attended not only by the farmers and the merchants, but by the nobility and gentry of Sleswick and Holstein. Near Kiel there is an antient castle delightfully situated, but not inhabited. It is now fitting up for the residence of the prince of Holstein Glücksburg, who has married the Princess Wilhelmina, daughter of the king of Denmark, on her divorce from her first husband, Prince Frederick. There is a small congregation of Christians of the Greek religion at Kiel. There is also an establishment for sea-bathing, and steam-boats ply regularly between Kiel and Copenhagen.

KIEN LOONG, son of the emperor Yung Tching, and grandson of Kang He, succeeded his father on the throne of China in 1735, being then twenty-six years of age. The principal events of his long reign are: 1. The war which he carried on, from 1753 to 1759, against the Olots or Eleuts, the Kashgars, and other Tartar nations of central Asia, who, under the descendants of Galdan, or Contaïsh, the Tartar chief, who was subdued by the arms of Kang He in 1696, had again revolted. Kien Loong defeated them, and again established the Chinese supremacy over central Tartary, north-west of China, as far as Kashgar. In consequence of these successes a great triumph took place at Pekin, in April, 1760, on the return of the victorious army. 2. In 1770 the Turguts, a Mongolian tribe, dissatisfied with the Russian government, having removed from the banks of the Volga, after crossing the steppes of the

Kirghis and other tribes, came to place themselves under the protection of China, when Kien Loong, rejoicing at this event, gave them a part of the country of the expelled Eleuts. (Amiot, *Mémoires concernant les Chinois.*) 3. In 1773 Kien Loong attacked and conquered the Miao-tse, a race of mountaineers on the borders of the province of Koei-cheow, north-west of Canton, who had never been subdued before. By the Chinese accounts great barbarities were committed by the conquerors, and the tribe was said to be nearly exterminated; but yet we find this same tribe rising again in great numbers so late as 1832, and giving full employment to two Chinese armies commanded by the viceroys of Canton and of Hoonan. However, Kien Loong commemorated his victory over the Miao-tse by paintings, which were copied and sent to France to be engraved. 4. About the years 1790-91, the rajah of Nepaul having invaded Tibet, a Chinese army was sent against him, which obliged him to withdraw to his own dominions, and the country of Lassa or Tibet was placed under the protection of China. (Staunton's *Narrative of Lord Macartney's Embassy*, vol. ii., ch. 1.)

Among the remarkable circumstances of Kien Loong's reign may be mentioned his edict of 1753, forbidding the exercise of the Christian religion under severe penalties, in consequence of which a kind of persecution against the Christian converts took place in several of the provinces. The Jesuit missionaries at Pekin however, as men of science, continued to enjoy the favour of the emperor, who was himself fond of learning, and a poet. [AMIOT, LE PERE.] He collected an immense library of all the most interesting Chinese works, and caused a geography of China to be compiled, as well as a Chinese and Mantcheou dictionary. Another remarkable occurrence of his reign is his reception of the British embassy in 1793, the particulars of which, upon the whole, reflect credit upon the character and intellect of Kien Loong.

In February, 1796, Kien Loong, having completed the sixtieth year of his reign, abdicated in favour of his son Kea King, a very inferior man to his father. Kien Loong died in February, 1799.

KIEW (written also Kieff, Kiev, Kiow) is a government of that part of Russia in Europe which is called Little Russia, and lies between 48° 30′ and 51° 50′ N. lat., and 28° 40′ and 33° 25′ E. long. It has an area of 20,540 square miles, or somewhat more than one-third of that of England and Wales. It borders on the governments of Minsk, Tchernigow, Poltava, Kherson, Podolia, and Volhynia. The surface of the country is undulating; the hills and high lands, which follow the course of the rivers, do not in any part attain a considerable elevation. There are many pleasing rural views, but no grand or striking natural scenery; and in general there is the sameness that is usual in flat countries. The Dnieper range of hills can only be considered as the last ramification of the Carpathians, which it joins in Podolia: in the circle of Tschigri a branch of it quits the river, and traverses the whole southern part of the province in a north-western direction. The land to the north of this branch has an extremely rich and fertile soil. On the south the soil is poorer, more sandy, and like a steppe; but still there are tracts of luxuriant corn-fields and good pastures. The chief, and in fact the only navigable river is the Dnieper, which however is a frontier river, forming the entire north-eastern boundary between this province and Tchernigow and Poltava for nearly 250 miles. It is from 600 to 1200 feet wide, flows with rapidity, has hard, muddy water, and here and there blocks of stone and eddies, which however do not obstruct the navigation in this province. The chief rivers that flow into it are: 1. The Pripetz, which comes from Minsk, and is here joined by the Ush or Usza from Volhynia; 2. The Teterew, from Volhynia, which receives several streams before it falls into the Dnieper; 3. The Irpen; 4. The Stugena; 5. The Ross, which rises in the west of the province, divides into two arms, and forms a large island; and 6. The Tiasmin, which comes from Kherson. There are no lakes of any consequence in the whole province: most of the small lakes are in the southern part. The climate is extremely mild and dry, and adapted to all the productions of the temperate zone, though no vines are cultivated. The rivers freeze in December, and thaw in February; but there are some winters (though they are rare) when there is very little snow and ice: the north wind however is always severely felt. The heat in summer is often so great that the rivers are dried up. Rain seldom falls in summer. Locusts are common, and the migratory locust often does great injury.

Agriculture is the chief employment of the inhabitants. The fruitful soil produces all kinds of corn, pulse, hemp, flax, and tobacco. The millet is of a peculiar kind, bearing several ears on one stem; the grain is large, round, and of excellent quality. The gardens produce all kinds of vegetables, and likewise melons, water-melons, and various kinds of fruit. Fruit of all kind prospers, except the vine. The country-people however do not grow much fruit, but are content with their wild wood-berries.

Kiew has more and better timber than any other province of Little Russia. Next to agriculture the breeding of cattle is the chief occupation of the inhabitants. The oxen are large and of a good breed, generally of a grey colour Great numbers are fattened and sent to Austria, Germany, and the interior of Russia. The horses are small, but have many good qualities, and are very fit for light cavalry. Few sheep are kept, but great numbers of swine. In the forests there are foxes, a few wolves, fewer bears, but many deer; there are hares, partridges, quails, and ortolans. In the Dnieper there are beavers and otters, but they are rare, and in that and the other streams there are many kinds of river fish, though not sufficient for the consumption of the people. The only minerals made use of are clay, lime, chalk, stone for millstones, and bog-iron. The manufactories are unimportant; they are confined to the towns, and furnish very little for exportation. The trade consists in the exportation of the produce of the province, and the importation of salt, metal, wine, manufactured goods, and colonial produce. The population is 1,530,000. The villages are much closer together than in Great Russia, and have a very cheerful and pleasing appearance; and all the houses have gardens, in which there are at least cherry and plum trees. The houses in the country are made of brushwood and branches of trees, covered with clay within and without, all whitewashed and thatched, and kept very clean, all the rooms being regularly washed twice a week. The inhabitants are chiefly Little Russians; they are a more poetical people than the Great Russians, are passionately fond of music, and always sing at their work. The subjects of their songs are the beauties of nature, love, and brandy. In general the Little Russian sings, plays, and dances whenever he can; his dances are full of voluptuous attitudes. He is addicted to drinking, though not so much so as other Russians, and has better but very intoxicating beverages. Industry is not one of his virtues, and he only works as much as is necessary for his subsistence and the gratification of his most urgent wants. In the town of Kiew there are many Great Russians and Germans; the Poles are the chief landholders and nobles, and possess almost all the great estates. Jews are everywhere numerous; they have all the public-houses, inns, and shops, and are likewise the butchers, cattle-dealers, &c. Most of the inhabitants are of the Greek church, under the archbishop of Kiew and Galiz, whose diocese, erected in 932, is of the first class, and has under it 1304 parishes. Of the Poles, many are Roman Catholics, and some Calvinists; of the Germans, many are Lutherans. The Jews have their synagogues and rabbis. The nobility are numerous, but few families are very wealthy. In the old province of Kiew the Polish nobility amounted to 42,207 persons, and the government as now constituted probably has as many. The citizens are poor, the Jews being in possession of nearly all trades in the towns; the peasantry are almost all serfs.

KIEW, the capital of the above government, situated in 50° 27′ N. lat. and 30° 27′ 45″ E. long., is built on a hill on the right bank of the Dnieper, which has of late years so much decreased both in width and depth, that the trading barks commonly navigate the narrow channel in the middle of the stream. There is a bridge of boats across the river. The town consists of three parts, each at some wersts distant from the others, viz.: 1, the old fortress Petschersk, with celebrated caverns and catacombs, containing the bodies of 118 saints well preserved. Nestor, the most ancient Russian historian, lived in this convent. 2. Old Kiew, or Sophienstadt, containing the fine cathedral of St. Sophia, and the residence of the archbishop. 3. Podol, containing most of the private houses, 20 churches, an imperial palace, and the townhall. A fourth quarter was built under Catherine II., and called Vladimirstadt; but even in 1821 it was scarcely inhabited, and later writers do not mention it. Besides its cathedral, 25 churches, 9 convents, and a Greek

ecclesiastical academy, Kiew has a university, founded in 1834, called St. Vladimir's university, which has obtained the library and collections of the Volhynian Lyceum at Krzeminiec. Kiew contains the oldest Greek ecclesiastical academy in Russia, which was founded in 1588 and confirmed in 1737: it has 10 professors and above 1000 students. The troubles which agitated the provinces which now compose the district of Kiew had caused the lyceum of Krzeminiec to be transferred to that city. Some time afterwards the emperor resolved to re-organize that institution by placing it on a broader and more solid basis, chiefly with respect to the education of the youth of the governments of Kiew, Podolia, and Volhynia. The lyceum of Kiew has consequently been transformed into a university, to which the name of St. Vladimir's University was given. (Ukases of 8th November and 25th December, 1833.) It is endowed with all the revenues of the lyceum of Krzeminiec, and has the library and all the collections belonging to that institution. In 1836 there were 88 professors and masters, and 203 students. The observatory is well furnished with instruments, and the library consists of above 46,000 volumes. There are considerable manufactories of earthenware, many tanneries, and a very celebrated fair, attended by 30,000 Turks, Armenians, Germans, Swiss, English, &c. The population is about 40,000.

KILDA, ST., the most northern of the Hebrides, is situated in 59° N. lat., and consists of an uneven mountain-ridge, whose most elevated point, called Conochan, rises 1380 feet above the sea-level. Dr. MacCulloch estimates the greatest width of the island at two miles, and its length at three miles; but according to other authorities its length does not exceed two miles. With the exception of some imperfect peat upon the higher points, the whole of the surface is covered with a thick turf of the freshest verdure, and highly susceptible of cultivation, were it not for the westerly winds which limit the agriculture to the south-east declivity, where there is most shelter, and where the village is situated. The tract adjoining the village is held conjointly by the inhabitants, their respective ridges being interchanged every three years. The rest of the island is in pasture, allotted to sheep and black cattle, the average stock of which is estimated at 2000. Although the people dress in the English or Lowland style, and no trace of either kilt or tartan is to be seen, the English language is altogether unknown, and Gaelic is the only one understood. The chief part of their food consists of the flesh and eggs of the sea-birds, among which the gannet, puffin, and fulmar are most in request; and the supply furnished by these birds is so abundant that little or no attention is given to fishing, although large shoals of cod and ling are frequently seen. The down of the fulmar is also much valued; and in 1815 the rent of the island, which averages 40*l.* per annum, was paid wholly in the feathers of that bird. There are three principal springs, the largest of which, Tober-nam-buy, produces a considerable stream. The population in 1824 was distributed among twenty families, and consisted of 110 individuals. (See MacCulloch's 'Highlands,' from which this notice is chiefly drawn.)

KILDARE, an inland county of the province of Leinster, in Ireland; bounded on the north by the county of Meath, on the east by the counties of Dublin and Wicklow, on the south by the county of Carlow, and on the west by the Queen's and King's counties. According to the map published under the superintendence of the Society for the Diffusion of Useful Knowledge, it is situated between 52° 50′ and 53° 25′ N. lat., and between 6° 27′ and 7° 10′ W. long. Its greatest length from north to south is 32 Irish or 40¼ statute miles, and its greatest breadth from east to west is 21 Irish or 26¾ statute miles. According to the above map, it has an area of 381,818 statute acres, or 597 statute square miles. The area is elsewhere estimated at 392,435 statute acres, of which 325,988 are cultivated ground, and 66,447 acres are unprofitable bog and mountain. The population in 1831 was 108,424.

The surface is more flat than that of any other county of Ireland. The only considerable elevations are the hills of Rathcoole, which form the western extremity of the range of the Dublin mountains, and a detached group which occupies part of the southern margin of the Bog of Allen in the central northern division of the county. This group consists of the Red-hill, Dunmurry-hill, Grange-hill, and the Hill of Allen, which last is detached from the others, and terminates the range on the north-east. It is a conical hill nearly insulated by tracts of bog, and rises about 300 feet above the level of the surrounding country, which is here about 260 feet above the level of the sea. An open table-land extends from the southern base of this group to the acclivities of the Wicklow mountains on the south-east, and divides the middle and southern parts of Kildare into two districts, of which the one slopes gradually towards the river Liffey on the east, and the other towards the river Barrow on the west. North from the Dunmurry range the upland district spreads east and west, forming the southern boundary of the basin of the river Boyne on the west, and the western and northern boundary of the valley of the Liffey on the east. It is here overlaid to an extent of 50,000 statute acres by a portion of the vast tract of peat bog called the Bog of Allen. This part of the county is traversed by the Grand and Royal canals in nearly parallel lines from east to west.

The district which slopes towards the Barrow, comprising the western part of the county from the Bog of Allen to the county of Carlow, is divided into three open vales by low ranges of undulating ground extending in parallel directions from the central table-land towards the south-west. The declivity in each of these is very gradual, the channel of the Barrow being not more than 100 feet below the general level of the upland district. The most northern of these vales, included between the summit level of the Bog of Allen on the north and the range of the Dunmurry hills on the south and south-east, is drained by the Feagile and Little Barrow or Rathangan rivers, which, uniting at the lower extremity of the valley, join the Barrow where that river, changing its course from an eastern to a southern direction, becomes the boundary of Kildare. The northern side of the valley is greatly encumbered with bog; the southern side is open and arable. About midway between the source of the Little Barrow and its junction with the Great Barrow is the thriving market-town of Rathangan, through which a branch of the Grand Canal, diverging from the main trunk at the head of the valley, is carried in a direction parallel to the tributary river to join the Barrow Navigation at Athy. The length of this line from Lowtown on the summit level to Athy is 27 miles 7 furlongs. Monasterevan, situated near the junction of the lesser and greater Barrows, also possesses great advantages as a station for carrying on traffic. The Barrow is here crossed by the above canal, which from Monasterevan to Athy is carried along the western bank of the river. From the level at Monasterevan another branch canal is carried westward to the towns of Portarlington and Mountmellick, in the Queen's County, a distance of 11½ miles. The country about Monasterevan on both sides of the river is well improved. Moore Abbey, an antient seat of the Loftus family, and latterly the residence of the Marquis of Drogheda, is situated on the east bank. The present mansion, which is surrounded by a well timbered tract of country, occupies the site of an abbey founded here by St. Abban in the seventh century, and re-edified by O'Dempsy and O'Connor in the twelfth century. Ten miles south from Monasterevan on both banks of the Barrow is Athy, at the junction of the Barrow Navigation with the above-mentioned branch of the Grand Canal. Athy was formerly a place of importance as a frontier town of the English Pale. It had greatly declined prior to the opening of these lines of navigation, but is now the chief point of traffic between Dublin and Carlow. A series of low detached hills, extending from Athy in a north-easterly direction to Old Kilcullen, includes an open tract of country about eight miles square, watered by the river Finnery. The lower part of this district is chiefly occupied by bogs. The town of Kildare, at present a small place, is situated on the elevated tract at the upper end of the vale. It is a town of great antiquity, and still possesses numerous remains of former importance, including the ruins of a cathedral, castle, and several religious houses, with a very high and perfect round tower. The surrounding country is open, and generally under tillage, with the exception of the Curragh of Kildare, a common containing upwards of 3000 Irish acres, which extends six statute miles along the crest of the table-land between the towns of Kildare and Kilcullen. This is a celebrated race-ground; the turf throughout is close and elastic, and the surface smoothly undulating. Old Kilcullen is situated on a hill a mile and a half from the eastern extremity of the Curragh. It was formerly a walled town, and is said to have had seven gates. The erection of a bridge over the Liffey, in 1309, at New

Kilcullen, about two miles to the north, led to its decay; it is now an insignificant place. Southward and eastward from the range of hills extending from Kilcullen to Athy lies a fertile tract watered by the rivers Greece and Leir, which fall into the Barrow at the southern extremity of the county. The upper portion of the valley of the Greece is highly cultivated, and to a great extent in demesne lands. On this river, near its source, is the neat and prosperous village of Ballytore, the principal inhabitants of which are Quakers. Farther south are the villages of Timolin and Moone, the latter on the Greece, near Belan, a seat of the earl of Aldborough. Belan House, at the time of its erection in the beginning of the eighteenth century, was considered the most splendid modern mansion in Ireland. It is however a plain structure which would now rate among residences of the second class. The great southern road from Dublin, passing through Ballytore and Timolin, leads to Castledermot, a tolerably well-built town on the river Leir, near the southern extremity of the county. Prior to the arrival of the English, this was the seat of the O'Tooles, princes of Hy-Mail, a territory extending out of Wicklow into the southern parts of Kildare. During the Anglo-Norman period it was a place of importance in the Pale: there still remain numerous ruins of its ecclesiastical and military buildings, including a round tower in good preservation. The country is here open and under tillage, but bare of timber.

That part of the valley of the Liffey which is included within this county is formed by the western slope of the Dublin mountains on the one side, and by the subsidence of the table-land of Kildare on the other. Naas, the most considerable town in the county, is situated about two miles east from the river, in the centre of the plain included between it and the range of the Dublin mountains. A branch of the Grand Canal is carried from Newbridge to Naas, and thence to Corbally Harbour, within 1½ miles of Kilcullen Bridge. On the great southern road from Dublin to Naas, about a mile north from the latter, is Johnstown, a remarkably neat village in the vicinity of Palmerstown, the residence of Lord Mayo. The country in this neighbourhood is in a high state of cultivation, and much of it in demesne. The western bank of the river particularly, from the point where it enters the county to Leixlip on the Dublin boundary, is almost wholly occupied by a succession of demesne-lands, including numerous residences of the best class. Among these the most remarkable are Killadoon, the seat of the earl of Leitrim, Castletown, that of Colonel Conolly, and on the opposite side of the river, near the line of the Grand Canal, Lyons Castle, the residence of Lord Cloncurry. Celbridge, on the western bank of the Liffey, is a well-built town, and was, until recently, the seat of an extensive woollen manufacture. It is now declining in consequence of the cessation of these works. Leixlip, at the point where the Liffey enters the county of Dublin, is a picturesque village, much visited by pleasure parties from the metropolis. The banks of the Liffey are here steep and well wooded, and the river for a considerable distance runs in a series of rapids. A ledge of rock, about ten feet in height, stretching across the channel, forms a pleasing waterfall, called the Salmon Leap, which is the chief object of attraction. From Celbridge and Leixlip to Maynooth, situated three miles farther westward, the country is to a great extent in demesne. Maynooth, on the Ryewater, a tributary of the Liffey, which runs into the river at Leixlip, was formerly the chief seat of the earls of Kildare, considerable remains of whose castle are still standing. The town is neatly built, consisting of one main street, at the western end of which is the entrance to the Roman Catholic College, flanked by the ruins of the castle. Near the other extremity of the main street is the entrance to Carton, the residence of the duke of Leinster. This demesne is finely timbered: in the arrangement of the plantations regard has been had to the most pleasing combination of autumnal tints. The house consists of a centre of grand proportions connected by colonnades with pavilions, and contains a good collection of pictures and other works of art. The Royal Canal, crossing the Ryewater by an aqueduct a little above Leixlip, passes Maynooth, and so westward by Kilcock, a thriving market-town on the borders of Meath. Westward from Kilcock, the Royal Canal crosses the Blackwater and Boyne rivers by aqueducts within this county. The district traversed by this canal is, for the most part, open and arable, rising southward towards the Bog of Allen, the borders of which in one place approach within a mile of the line of navigation. The Grand Canal, which crosses the Liffey by an aqueduct near Naas, and runs nearly parallel to the Royal Canal across this county, is carried through the above-mentioned bogs at a distance of about ten miles farther south. The tract which it traverses comprises about 40,000 statute acres of peat-moss, in some places 40 feet deep, reposing on limestone gravel, which rises in low cultivable ridges between the principal fields of morass. The Island of Allen is an elevated tract of this kind, surrounded by bog, between the summit level of the canal and the town of Kildare. The summit level is supplied by two lateral branches, one of which, 5 miles in length, extends to Milltown, near Kildare in the south; and the other, 3¾ miles in length, is carried through the bogs of Cushlea to the Blackwood Reservoir on the north. A subsidence of 20 feet in the substance of the bog has been caused in some places by the opening of these extensive drains, and great tracts have been made available for purposes of turbary which were before inaccessible. Large quantities of peat are now cut all along the line, for sale in Dublin. The huts of the turf-cutters are excavated from the banks of the morass and covered with sods, and are the only habitations through successive tracts of several miles. The decayed village of Prosperous is situated near the eastern extremity of this dreary tract. An attempt was made to establish the cotton manufacture here in the latter end of the last century, and much money was expended on buildings; but the enterprise entirely failed.

The north-western part of the county, extending from the Bog of Allen to the Boyne, is open and chiefly in pasture. The towns here are Carberry and Johnston's Bridge.

The great southern and western mail-coach roads pass through Kildare: the former by Naas, where it divides, one branch going by Kilcullen Bridge to Carlow, and another by Newbridge to Maryborough; and the latter by the Meath boundary through Kilcock to Athlone. The remainder of the county is well provided with roads made and kept in repair by grand jury presentments.

The climate, from the quantity of boggy surface exposed, is more moist than that of the neighbouring counties on the north and south. In the central district the air is pure and keen; and milder and more salubrious in the valleys of the Liffey and Greece.

Geology.—The clay-slate, which flanks the granite axis of the Dublin and Wicklow mountains, occupies about one-fourth part of the surface of Kildare. It extends from the extremity of the Rathcoole group in the county of Dublin across the valley of the Liffey, whence it runs in a south-west direction towards Athy, forming the Kilcullen group, and occupies the entire valley of the Greece, with the exception of its lower extremity, where the verge of the limestone plain is interposed between it and the line of the Barrow. The granite tract of Carlow extends into the south-eastern extremity of Kildare as far as Castle Dermot, where the clay-slate passes into mica-slate along the eastern portion of their line of junction. The remainder of the county is occupied with the floetz limestone of the great central plain, broken only by the group of Dunmurry and the Hill of Allen. The Hill of Allen is composed of a mass of granular compact greenstone and greenstone porphyry protruded through the floetz limestone. Large crystals of hornblende and felspar occur throughout the greenstone. Red Hill, Dunmurry Hill, and the western foot of Grange Hill consist of alternating beds of fine-grained grauwacke, grauwacke slate, and clay-slate, with a general dip of 60° towards the south-east, but in some places vertical. A small patch of red sandstone conglomerate occurs on the northern declivity of Red Hill. These strata, which have been quarried for millstones, range east and west, and dip 17° north. Between Dunmurry Hill and Grange Hill, which consists of trap, the floetz limestone is interposed, and again between Grange Hill and the Hill of Allen. At the northern extremity of the Hill of Allen is a slight eminence called the Leap of Allen, composed of red sandstone conglomerate, which is quarried for millstones. Indications of copper have been observed on Dunmurry Hill, but hitherto there have not been any mining operations actually carried on within this county.

Soil and Agriculture.—The soil is generally a rich loam,

resting on limestone or clay-slate. Calcareous gravel, which is found through the greater part of the county, was profusely used as a manure during the last century; but from its exhausting effects on the soil it has been generally discontinued. The opening of the Grand and Royal canals has given facilities for obtaining manure of the best description from Dublin, by means of which the lands of the central and western districts are now in much better heart than they were at the beginning of the present century. The chief tract of pasture-land in this county is the Curragh, which is used as a sheep-walk. There are rich fattening lands in the baronies of Carberry, Clane, and North and South Salt, which occupy the north-western and north-eastern portions of the county. An improved system of agriculture has been introduced by the resident proprietors, and is practised to some extent by the smaller farmers. Oxen are in general use both for draught and the plough. The character of the stock has been much bettered of late years by the introduction of the best English breeds of sheep and black cattle. The late and present duke of Leinster have been mainly instrumental in promoting these improvements. The grain raised in Kildare is generally of prime quality: the quantity sold at the different market-towns in the years 1833 and 1835 appears from the following table:—

	Wheat. (barrels.)		Oats. (barrels.)		Barley. (barrels)		Bere. (barrels.)	
	1833.	1835.	1833.	1835.	1833.	1835.	1833.	1835.
Naas . .	941	750	16,085	12,796	50	50	1412	1125
Kilcock . .	40,000	40,000	12,000	12,000	1000	1000	7000	7000
Athy . .	57,720	37,811	19,472	19,878	8075	5797	..	..
Rathangan .	13,500	14,500	..	..	..	..	..	..
Kildare . .	1,090	1,113	1,152	1,230	380	145	150	388
Robertstown	..	..	3,000	3,000	..	..	..	..

There is no return from Kilcullen, which is also a considerable market for grain. Besides the grain disposed of in market, large quantities are sold by sample at the different mills and corn-stores within the county, or sent by the canals to Dublin. The milling trade is extensively carried on.

The only other manufactures carried on within the county are, a manufacture of cotton, on an extensive scale, lately commenced at Inchyguire, near Ballytore, and a small manufacture of woollens still continued at Celbridge.

The condition of the working-classes is somewhat better than in most of the neighbouring counties. The average rate of wages for agricultural labourers is 10*d.* per day, for about 110 working days in the year. The appearance of the peasantry is generally decent: and they use the English language universally.

Civil Divisions.—Kildare is divided into the baronies of Carberry on the north-west; Ikeathy and Oughterany on the north, containing the town of Kilcock, population (in 1821) 1730; Salt North on the north-east, containing the towns of Maynooth (pop. 2053), Celbridge (p 1647), and Leixlip (pop. 1159); Salt South; Naas North on the east, containing the town of Naas (pop. 3808) and the villages of Sallins (pop. 419) and Johnstown (pop. 101); Naas South; Kilcullen, also on the east, containing the town of Kilcullen Bridge (pop. 699); Narragh and Rheban East, containing the town of Ballytore (pop. 933); Narragh and Rheban West, containing the town of Athy (pop. 4494); Kilkea and Moone on the south, containing the town of Castledermot (pop. 1835), and the village of Moone (pop. 244); Ophaly East, containing the town of Kildare (pop. 1753); Ophaly West, containing the towns of Monasterevan (pop. 1441) and Rathangan (pop 1165); Clane in the northern centre, containing the towns of Clane (pop. 1216) and Prosperous (pop. 1038); and Connell in the southern centre, containing the town of Newbridge (pop. 377) and the village of Robertstown (pop. 281).

Athy is incorporated by charter of 11 James I. The governing body consists of sovereign, bailiffs, and burgesses. The sovereign holds a court having jurisdiction to the amount of 40*s* Irish. The revenue of the corporation is 154*l.* per annum. Naas is incorporated by charter of 11 Elizabeth and 7 James I.; but no court has existed here for several years. The corporation of Kildare, created by charter of Henry VIII., is now extinct; so also is that of Harristown, incorporated by charter of 33 Charles II.

Prior to the Union Kildare was represented in the Irish Parliament by ten members; two for the county, and two members for each of the above corporate towns. It is now represented in the Imperial Parliament by two county members only. In 1836 the county constituency was 1382 The assizes are held alternately at Naas and Athy, in each of which there is a county court-house and gaol. The general quarter-sessions are held at Athy, Maynooth, Kildare, and Naas. The constabulary force in the year 1835 consisted of 1 resident magistrate, 4 chief constables, 40 constables, 205 sub-constables, and 3 horse. The cost of maintaining this force for the year was 9079*l.* 18*s.* 10*d*, of which 4695*l.* 9*s.* 7*d.* was chargeable against the county. The total number of criminals committed to Naas gaol in 1836 was 399, of whom 328 were males and 71 females. Of these 72 males and 5 females could read and write, 92 males and 19 females could read only, 155 males and 44 females could neither read nor write, and of 9 males and 3 females the instruction could not be ascertained. The total number of offenders committed to Athy gaol in the same year was 328, of whom 184 were males and 54 were females. Of these 65 males and 6 females could read and write, 58 males and 5 females could read only, 57 males and 41 females could neither read nor write, and of 4 females and 2 females the instruction could not be ascertained. The district lunatic asylum for Kildare is at Carlow. There is a county infirmary at Kildare, and fever hospitals at Celbridge, Naas, and Kilcullen; dispensaries are established in all the towns and chief villages. There are extensive cavalry barracks at Newbridge, and infantry barracks at Naas and Athy.

Population Table.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	11,205	..	..	..	..	..	..	56,000
1813	Under Act of 1812 . . .	14,564	..	..	..	..	..	..	85,133
1821	Under Act 55 Geo. III. c. 120	16,478	19,180	..	..	..	49,988	49,077	99,065
1831	Under Act 1 Will. IV. c. 19 .	17,155	18,711	11,880	3,315	3,576	54,472	53,952	108,424

History and Antiquities.—In the antient division of Ireland the south-eastern portion of Kildare was included in the territory of Hy-Mail, of which O'Toole was prince; the south-western portion formed part of O'Connor's territory of Hy-Failge; the western division belonged to Hy-Ceallan, and a small portion of the north to the kingdom of Meath; with the exception of which last part the whole was included in the kingdom of Leinster. Leinster coming to Earl Strongbow by his marriage with Eva the daughter of Dermot MacMurrogh, was inherited by William Marshal, earl Pembroke, who married Isabel, only daughter and heir of Strongbow. He had issue five daughters, among whom the principality of Leinster was divided, A.D 1247. In this partition the county of Kildare was allotted to Sibilla, the fourth daughter, who married William earl Ferrers and Darby. Agnes, the eldest daughter of this marriage, was wife of William de Vescy, lord of Kildare and Rathangan, *jure uxoris*, and lord justice of Ireland. A dispute having arisen between him and Henry FitzThomas FitzGerald, lord of Ophaly, in A.D. 1293, it

was awarded to be settled by single combat; but Vescy, having fled into France to avoid the duel, was attainted of treason, and his estates bestowed on his antagonist. In 1296 Kildare, which up to this time had been under the jurisdiction of the sheriff of Dublin, was erected into a separate county. The Fitzgerald family, having subsequently adopted the pernicious system of Irish exactions, and usurped on the authority of the crown by trying all pleas before their own seneschals, to the exclusion of the king's sheriff, excited the hostility of the English government. Gerald earl of Kildare, being summoned to England to answer various charges of this nature to which he had exposed himself in his capacity of lord justice, left his son Lord Thomas Fitzgerald, a rash youth of twenty, his deputy. A report shortly after reached Ireland that the earl had been put to death, which so incensed Lord Thomas that he threw up his office of deputy, A.D. 1534, and entered into open rebellion, in which he was joined by the five brothers of the earl. Fitzgerald had at this time in his possession the six principal castles of Maynooth, Rathangan, Portlester, Athy, Loix in the present Queen's County, and Carlow. Maynooth and Rathangan being taken in 1534, he and his uncles submitted in the ensuing year. They were sent to England, and executed at Tyburn, Feb. 3, 1537. The earl had already died a prisoner in the tower of London. A younger brother of Lord Thomas, called Gerald, escaped during these disasters to the Continent, where he distinguished himself in the service of the Knights of Malta, and afterwards became master of the horse to the Grand Duke of Tuscany. In 1552 he was reconciled to the English government, and restored to his possessions.

This county was the theatre of various military operations during the wars which succeeded the rebellion of 1641. Of these the most important was the battle of Kilrush, fought 15th April, 1642, between the royalists under the earl of Ormond, and the Roman Catholic army under Lord Mountgarret, which latter party suffered a signal defeat. The number engaged on both sides amounted to about 15,000 men. The Kildare family were active in bringing about the Restoration, and espoused the Protestant cause in the subsequent wars of the Revolution of 1688. The forfeitures within this county attending on the latter event comprised 44,281 acres, valued at that time at 205,175*l.* 0*s.* 6*d.* The principal persons attainted were of the families of Eustace, Tyrrell, Lawless, and Trant. Several sanguinary engagements took place between the king's troops and the insurgents in this county in 1798. At Old Kilcullen the rebels had a temporary advantage, but were finally defeated here, as in various other parts of the county.

Numerous earthen works, partly military and partly sepulchral, remain in this county. Of the first class, the most remarkable are the rath of Knockawley, the antient palace of Allen, about a mile west from Old Kilcullen, the moat of Mullamast, the antient Carmon, near Ballytore, and Rath-Ardscull near Athy. There are numerous sepulchral mounds on the Curragh; and here in the time of Giraldus Cambrensis was a stone monument similar to Stonehenge. Pillar stones of large dimensions are still standing at Mullamast, Kilgowan, Forenaghts, Punch's Town and Harristown. There are round towers at Kildare, Taghadoe, Kilcullen, Castledermot, and Oughterard. Among the ruins of the numerous religious houses of this county, the most remarkable are those of the cathedral church at Kildare, the Franciscan abbeys at Castledermot and Clane, Great Connell Abbey on the bank of the Liffey near Newbridge, and the remains of several religious establishments in Naas. At Castledermot, Moone, and Old Kilcullen are stone crosses ornamented with curious sculptures. The castles of Athy, Maynooth, Kilkea, Rheban, Castledermot, Kilberry, Woodstock, Castle Carberry, Ballyteague, Clane, Lackagh, Donadea, Kildare, Leixlip, Timolin, Corifig, and Morristown Nenagh are still standing. The castles of Kilkea, Donadea, and Leixlip are still inhabited.

This county is partly in the diocese of Dublin, but chiefly in that of Kildare, which, in point of education, rank respectively 19th and 8th among the 32 dioceses of Ireland. It contains the two principal Roman Catholic Educational Establishments in Ireland, at Maynooth and Clongoweswood. The Royal College of St. Patrick, Maynooth, was founded pursuant to an act of the Irish parliament passed in 1795. The object of the institution is to provide a home-education for the Irish priesthood of the Roman Catholic Church, who were formerly obliged to resort to the Continental colleges. It was first opened for the reception of fifty students, in October, 1795. A lay-college was shortly after attached; but this was discontinued in 1817. The buildings now accommodate 450 students. Of this number 250 are free students, who are selected by the bishops of the several dioceses at yearly provincial examinations; and pay eight guineas at entrance, which is their only expense. The remainder are either pensioners who pay twenty-one guineas per annum and four guineas entrance, or half pensioners who pay only half the annual sum. The establishment is supported by these payments, by private bequests, and by a parliamentary grant of 8,928*l.* per annum. The college is governed by a president, vice-president, dean, and procurator, or bursar: there are professors of the sacred scriptures, of dogmatic theology, of moral theology, of natural and experimental philosophy, of logic, of belles lettres, Hebrew, Greek, and Latin, English elocution, and of the Irish and French languages. The students rise at half-past five o'clock, and retire to rest at half-past nine in the evening. The period of study is usually five years, of which two are devoted to humanity, logic, and mathematics, and three to divinity, but the course is sometimes shortened by the omission of mathematics. The building consists of a plain centre with extensive returning wings. The cost of its erection, before some late additions had been commenced, was about 32,000*l.* There are fifty-four acres of land attached, which are laid out as a park for the recreation of the students.

The lay-school at Clongowes, near Clane, was opened as a seminary for the sons of the Roman Catholic nobility and gentry in 1814. It is conducted by Jesuits, of whom there are forty-five resident in the institution. The building is a spacious quadrangle flanked by round towers, and has an imposing appearance. There is a museum, library, and theatre for lectures in natural and experimental philosophy. The institution is governed by a president, dean, and procurator, or bursar. There are six professors of various branches of the classics, a professor of mathematics, and a professor of natural philosophy. The course of education is more extended in classics than in the sciences.

The county expenses are defrayed by grand jury presentment. The amount levied in the year 1835 was 19,554*l.* 18*s.* 9*d.*, of which 1221*l.* 7*s.* 10*d.*, for public roads, was charged to the county at large; 6051*l.* 12*s.* 5*d.*, for public roads, was charged to the several baronies; 5206*l.* 7*s.* 8*d.* was for the public establishments of the county; 4713*l.* 15*s.* 10½*d.* for police, and 2304*l.* 14*s.* 11½*d.* in repayment of loans advanced by government.

(*Statistical Survey of Kildare; Transactions of the Geological Society*, vol. v.; Cox's *History of Ireland:* Brewer's *Beauties of Ireland; Parliamentary Reports, Papers*, &c.)

KILDARE, a bishop's see in the archiepiscopal province of Dublin, in Ireland. It comprises parts of the three counties of Kildare, King's County, and Queen's County, extending from east to west 46 statute miles, and from north to south 29 statute miles. The chapter consists of a dean, precentor, chancellor, treasurer, archdeacon, 4 prebendaries, and 4 minor canons.

In 1792 there were in this diocese 81 parishes, constituting 31 benefices, having 28 churches of the establishment. In 1834 the numbers were, parishes 80, benefices 41, churches of the establishment 35, other places of Protestant worship 4, Roman Catholic places of worship 110. In the latter year the gross population of the diocese was 134,356, of whom there were 13,907 members of the Established Church, 9 Presbyterians, 384 other Protestant Dissenters, and 120,056 Roman Catholics, being in the proportion of 8¾ Roman Catholics to 1 Protestant nearly. In the same year there were in this diocese 215 daily schools, educating 12,633 young persons of both sexes, being in the proportion of 9·4 per cent. of the entire population under daily instruction, in which respect Kildare ranks eighth among the 32 dioceses of Ireland. Of the above schools 44 were, in 1834, in connection with the National Board of Education.

The foundation of this see is ascribed to St. Conlaeth, a follower of St. Brigid, by whose assistance he is said to have founded the original cathedral in the beginning of the sixth century. Aodh Dubh, who died A.D. 638, is the next bishop whose name has been preserved. He had been king of Leinster, but retired from secular affairs and became successively monk, abbot, and bishop of Kildare. The see was

for seven years vacant between the death of Simon of Kilkenny, A.D. 1272, and the succession of Nicholas Cusack, declared bishop by Pope Nicholas III., to whom a dispute respecting the election of two other candidates had been re ferred. William Miagh, who succeeded in 1540, was reckoned among the prelates who wished well to the Reformation His successor Thomas Lancaster was the first Protestant bishop; he was consecrated by Browne, archbishop of Dublin, July, 1550. The revenues of the see were greatly diminished by Alexander Craik, who was bishop from 1560 to 1564: he exchanged most of the lands and manors of the bishopric with one Sarsfield, taking some tithes of little value in return. On account of the poverty of the bishopric so caused, the bishops of Kildare have continued, since the year 1681, to hold the deanery of Christ Church in Dublin, and the preceptory of Tully in the county of Kildare in commendam. The quantity of land belonging to the see is 911 acres, and the gross annual revenue of the bishop, on an average of three years ending December 31, 1831, was 6451*l.* 13*s.* 3*d.* By the 3rd and 4th Will. IV., c. 37, this see when vacant becomes united to the see of Dublin, and the deanery of Christ Church and preceptory of Tully become united with the deanery of St. Patrick's, Dublin. The temporalities will then vest in the Ecclesiastical Commissioners. The bishop has no residence within the diocese. The choir of the cathedral is the only part now in use; the nave and transepts having been reduced to ruins in the parliamentary war. Near the cathedral are the ruins of a small building where the sacred fire of St. Brigid was formerly kept burning. This superstitious practice was suppressed by Henry de Loundres, archbishop of Dublin, in the 13th century, but was subsequently revived, and only ceased finally at the time of the Reformation.

(Ware's *Bishops;* Beaufort's *Memoir of a Map of Ireland; Parliamentary Returns.*)

KILKENNY, an inland county of the province of Leinster in Ireland; bounded on the north by Queen's County, on the east by the counties of Carlow and Wexford, on the south by the county of Waterford, and on the west by the county of Tipperary. Its southern and western limits are also those of the province of Leinster, of which this county forms the south-western extremity. According to the map constructed under the superintendence of the Society for the Diffusion of Useful Knowledge it lies between 52° 13′ and 52° 53′ N. lat., and between 6° 55′ and 7° 38′ W. long. Its greatest length from the Slienmargie Hills on the north to the river Suir on the south is 36 Irish or 45¾ statute miles. Its breadth varies from 15 statute miles at its southern extremity to 24 across the northern districts. The area, according to the above map, is 469,170 statute acres, or 733 statute square miles. It is estimated by Mr. Griffith at 536,686 statute acres, of which 417,177 are cultivated land and 96,569 unprofitable bog and mountain. The population in 1831 was 169,945, exclusive of the city of Kilkenny, the total population being 193,685.

The navigable rivers Barrow and Suir form the greater part of the eastern and the whole of the southern boundary of Kilkenny, and the partly navigable Nore traverses its entire length from north to south-east. The northern part of the district between the rivers Nore and Barrow, including portions of the Queen's County and county of Carlow, is occupied by a hilly tract of country, extending 15 statute miles by 20. In Carlow and Queen's County these elevations form a continuous range. On the Kilkenny side they spread into numerous lateral groups, the general direction of which is from north-north-east to south-south-west. The principal valley on this side is watered by the Dian river, which rises in the north-eastern extremity of the county, and passes through the village of Clogh and the town of Castlecomer. Being joined by the Dineen and Dubhglass rivers from the east, it runs into the Nore five miles north of Kilkenny city. The valley of the Nore, from the northern extremity of the county to this point, is confined between the declivities of the Castlecomer Hills on the east and two groups of similar formation rising from the right bank of the river towards Tipperary on the west. Between the two latter groups the low ground spreads westward by the neat town of Freshford, expanding into a rich plain which occupies the north-western extremity of the county, and contains the towns of Urlingford, Johnstown, and the village of Ballyspellan, famous for its spa. In a detached portion of this plain, surrounded by the lands of the Queen's County, is the well built town of Durrow, situated on a small stream running eastward to the Nore. The town is built in the form of an oblong square. most of the houses are slated, and many of them are occupied by genteel private families, led to reside here from the convenience of the situation, which is central to the places o chief importance in Kilkenny and Queen's County. This insulated district, containing about 2000 acres, originally formed a portion of the lordship of Ossory in the Queen's County, and was annexed to Kilkenny by act of parliament at the instance of the Earl of Ormonde. The object was to repress the outrages committed against the Earl's tenantry by the sept of the Fitzpatricks, who, when tried in the Queen's County, were always acquitted, but rarely escaped conviction when brought to Kilkenny. In the neighbourhood of Durrow is the residence of Viscount Ashbrook, and between it and Ballyragget on the road to Kilkenny is Ballycondra, the antient seat of the Viscount Mountgarret, whose descendants now possess the earldom of Ormonde. Ballyragget, another seat of the Butler family, is now a thriving town on the left bank of the Nore, 9½ miles north of Kilkenny city. Here is an old castle of the lords Mountgarret, which has been converted into a barrack. Five miles south-east of Ballyragget, near the road from Castlecomer to Kilkenny, is the remarkable cave of Dunmore. The entrance is by a picturesque hollow clothed with brushwood, at the extremity of which the cavern opens by a natural arch fifty feet high. There are several chambers within encrusted with stalactites and traversed by a subterranean stream. Southward from these hilly districts, the plain, which to this extent is confined to a narrow strip on each side of the Nore, expands across the entire central part of the county, spreading into Tipperary on one side and Carlow on the other, with an open undulating surface characteristic of the great limestone field of which it forms a part. The city of Kilkenny [KILKENNY, *City*] is situated on both sides of the Nore where that river enters the more open district. The Nore divides this central plain into two nearly equal portions. The chief drainage of the eastern portion is towards the Barrow, on one of the streams running into which the town of Gowran is situated. This place gave title successively to branches of the families of Butler and Fitzpatrick, and was in the fourteenth century the principal residence of the Earl of Ormonde, who had a very strong castle here. It was greatly decayed about the beginning of the present century, but is now improving. It is principally the property of Viscount Clifden, whose mansion, Gowran Castle, is in the vicinity. The demesne and deer-park are extensive and well timbered, and the house is a fine edifice. Thomastown, situated on the Nore 10½ miles south from Kilkenny, derives it name from Thomas FitzAnthony Walsh, seneschal of Leinster, by whom it was founded. The town has an appearance of antiquity, and is well situated for trade, the Nore being navigable up to this point. Mount-Juliet, the residence of the Earl of Carrick, is finely seated on the banks of the Nore near Thomastown. The banks of the river are steep and wooded, and the open country on each side to a great extent under demesne. The open district to the west is traversed by a considerable river called the Owenree, running eastward from the Tipperary boundary to the Nore, which it joins 3½ miles above Thomastown: the Munster river, which joins the Owenree from the north, forms the boundary between Tipperary and Kilkenny counties for several miles. Near the Tipperary boundary on the Owenree is Callan, a corporate town of some extent, but much decayed [CALLAN], and farther down the stream, the villages of Kells and Innisnag. Bennet's Bridge, a thriving village, is situated on the Nore 3½ miles above its junction with the Owenree. Beyond this central district the entire southern part of the county, with the exception of a strip of level land along the northern bank of the Suir, is occupied with hilly and mountainous tracts, connected on the east with the granite group of Carlow, and the west with the sandstone range of Slievenaman in Tipperary. On entering this district, the Nore, which from Durrow to Thomastown divides the county into two nearly equal portions, changes its course from south to south-east and runs by a deep valley to the Barrow, which it joins about 15 miles above the junction of their united streams with the Suir. The hilly district included between the two former rivers and the open country extending from Gowran to Thomas-

town is bounded towards the Barrow by a lofty range of hills terminated on the north by Brandon Mountain, which rises to a height of 1696 feet over the town of Graigue-na-managh on the Barrow. The range of Coppinagh bounds the district towards the open country on the west, extending from Mount Loftus near the Barrow to the heights above Innistioge on the Nore. Innistioge is a well built village of the larger class, having a handsome bridge ornamented with Ionic pilasters, and some remains of antient fortifications. From Innistioge eastward the banks of the river are clothed for several miles with the woods of Mr. Tighe's beautiful demesne of Woodstock. The scenery on both sides of this river from Thomastown to the Barrow, a distance of 13 miles, is in the highest degree picturesque. Between the ranges of Coppinagh and Brandon are several extensive valleys opening towards the Nore, which receives the Clodagh river from this side. A tongue of alluvial land called the Roer, extending above two miles in length, occupies the south-eastern extremity of the district at the point of junction of the Nore and Barrow; with the exception of this spot the western bank of the Barrow from Graigue to the Nore is precipitous, and in some places clothed with natural wood. South from the Nore the banks of the Ross river (by which name the united streams are known from New Ross to the harbour of Waterford) slope more gradually, and are highly cultivated. The hilly district west of the Nore and Ross rivers rises into mountains of considerable height and extent, of which the principal group, called the Walsh Mountains, lies between the Argula river running northward into the Nore above Innistioge, and the Kilmacow river running southward into the Suir above Waterford, and covers a space about ten miles in length by six in breadth. The pasturable part of this district is wholly occupied by dairy-farmers. The space between the southern declivities of the Walsh Mountains and other groups ranging towards Tipperary and the Suir is occupied to a breadth of from two to five miles by a level tract of rich land in which is situated the small but remarkably neat town of Pilltown, and the villages of Poleroan, Fiddown, and Kilmacow. In the vicinity of Pilltown are Bessborough, the seat of the Earl of Bessborough, a fine mansion containing some excellent specimens of the Italian and Flemish schools of painting, and Belline, a seat of the Walsh family, from whom the neighbouring district is named, where there is another good collection of pictures. A taste for art was very prevalent in this district in the beginning of the present century. The keeper of the village inn of Pilltown at that time possessed a cabinet collection, including pieces by Rubens, Vandyck, and Tintoretto. At the northern extremity of the hilly district is the village of Knocktopher, an antient seat of the Ormonde family, the ruins of whose castle are still standing. The fine mansion of Castlemorris, formerly the seat of the family of Montmorency-Morris, occupies a commanding site on the acclivity of the hill called King's Mountain near Knocktopher, in the vicinity of which is also a handsome residence of the Langrishe family.

The Suir is navigable for vessels of 120 tons up to the bridge of Carrick, which is situated in Tipperary close to the western limits of this county. At the bridge of Waterford it is in some places eight fathoms deep at low water. Ships of 800 tons ascend the Barrow to New Ross, and small vessels can ply as high as St. Mullins, about midway between Ross and Graigue, where the tide ends, and the Barrow navigation for lighters commences. The Nore throughout the upper part of its course from Durrow to Thomastown runs rapidly, and is subject to violent floods, having a fall of about 13 feet in a mile. From Thomastown to the Barrow it is navigable for boats carrying 10 to 15 tons. Vessels of 80 tons and upwards have been built at and below Innistioge. A canal from Thomastown to Kilkenny was commenced in 1755, and executed to a distance of four miles, but after the expenditure of large sums of money the works were abandoned.

Climate.—The general slope of the surface is to the south-east, which is the best aspect both for sun and shelter. Surface waters run off rapidly, and there is very little bog; the air is consequently dry and healthy. The substratum in general is either limestone or brittle schist, both conducing to a light mellow soil and early vegetation. Myrtles grow luxuriantly in the southern parts of the county; and an arbutus at Kilmacow in 1801 measured two feet seven inches round the stem, and covered a circuit of thirty yards.

Geology.—With the exception of the mountain groups of the south, the entire surface of Kilkenny is occupied by the floetz limestone of the central plain overlaid in the hilly districts north of Kilkenny city by the shale and sandstone of the Castlecomer and Killenaule coal-tracts. The coal formations are nearly co-extensive with the hilly districts; the limestone, where it forms the surface-rock, spreads into undulating plains sweeping round the hilly tracts, and occupying the intermediate valleys. The strata composing the coal districts consist of alternations of shale with argillaceous ironstone, compact quartzy sandstone, and sand stone slate. Each tract constitutes a separate basin, the strata in that of Castlecomer dipping from the edge towards the centre, so that the undermost strata appear on the outer edge, and the uppermost in the interior of the district. The coal raised from these beds is anthracite, or non-flaming coal, called also mineral charcoal, from its containing 94 to 96 per cent. of pure carbon. It is accompanied with culm, which is used extensively for burning lime; the coal itself is used for domestic purposes and malting. The Castlecomer district contains seven workable beds of different thickness, arranged one over the other. Of these the uppermost beds, being nearly free from sulphur, are the most valuable, and are now nearly exhausted. But the three lowest beds, containing an abundant supply, have never been worked except when they occur near the surface. The beds, in ascending order, consist of, 1st, a bed little more than one foot in thickness occurring at the height of about 800 feet above the limestone substratum; it has never been worked. Second bed, divided into two parts, each about one foot thick, by a layer of fine clay. The coal is somewhat slaty, particularly that of the lower member. This bed has been partially worked near the surface, but never to any considerable extent. The third bed, which is rather thicker and more solid than the second, is worked only in a few places. Fourth bed, usually composed of four feet of solid coal, and two feet of slaty coal; occurs over a great extent of the interior of the district, and is at present worked in several places. Fifth bed, one foot in thickness; not much worked. Sixth bed, the three foot coal, which has supplied the principal demand for upwards of a century, now nearly exhausted. The principal works are at Castlecomer, Clough, and Newtown. In 1836 the produce was 42,554 tons of coal, at from 15*s*. to 20*s*. per ton, and 53,354 tons of culm at 4*s*. to 5*s*. per ton. Workings are also carried on at Feroda and other places in the district for culm and coal, the produce of which, in 1836, was 18,500 tons of culm, at from 4*s*. to 6*s*. 8*d*. per ton. The stratum on which the three-foot bed rests has been found to answer remarkably well for fire-bricks and other articles which are exposed in use to a great degree of heat. That portion of the Killenaule, or Slieve Arda district, which extends out of Tipperary into this county, is not at present worked. The isolated tract north of Freshford produces nothing but culm. The limestone border generally follows the foot of these hills, but in some places it rises halfway up the acclivity, and in one or two instances forms considerable hills on the exterior. A deposit of limestone-gravel, including boulders of large dimensions, generally occupies the exterior hollows of these hills, which towards the south and south-east slope gradually to the central plain. The general colour of the limestone is a bluish-grey; the best for burning is of a blackish colour, and is found near Kilkenny and Thomastown. Iron, manganese, and silex are generally diffused through the limestone rock towards the borders of the coal tract, and prevent it from burning. Near Kilkenny it passes into a fine black marble, containing a great variety of impressions of madrepores and of bivalve and turbinate shells. These beds are extensively quarried, and the blocks dressed on the spot by a saw-mill driven by the Nore. The marble, which is sometimes procured of a jet-black, is manufactured into chimney-pieces, tombstones, &c.; it bears a very high polish, and can be raised in large blocks. The hall at Bessborough is supported by four Ionic columns, the shafts of which are each formed of a single block of marble from this quarry, ten feet six inches in height. Black primitive limestone also occurs at Ballyragget. The tract of limestone skirting the northern bank of the Suir is decomposed, along its northern boundary for a distance of several miles, into a friable marly rubble, which is extensively used for manure. The surface heats and slacks under rain as if it had been subjected to the action of fire, which appearance is confirmed by the fact of detached pieces of quartzy sand-

stone having been found among the decomposed calcareous strata in a vitrified state. Marl is found in large deposits in various other parts of the county. The mountain tract occupying the south of Kilkenny, with the exception of the primitive group of Brandon, consists of a nucleus of clay-slate surrounded by sandstone. The latter rock extends over the greater part of that portion of the Slievenaman group included in Kilkenny, and constitutes the entire tract of the Walsh mountains. The clay-slate again rises beyond the valley of the Argula, from which it extends eastward to the Ross river, and northward beyond the Nore, constituting the range of Coppinagh, and occupying the tract included between that range and the western declivities of the Brandon group. A margin of sandstone extends along the western foot of Coppinagh, so that the clay-slate is nowhere in contact with the field of limestone.

Minerals.—The chalybeate spa at Ballyspellin was much celebrated in the last century for its efficacy in the cure of cutaneous and scrofulous diseases. It is still visited by invalids, who derive considerable benefit from the waters; but its celebrity at present chiefly arises from the humorous verses of which Dean Swift and Mr. Sheridan have made it the subject. The water contains fixed air, iron, and probably fossil alkali. Essays concerning its properties, and in commendation of the air of the neighbourhood, were published in 1724 and 1725. There are chalybeates at Kilkenny city, Castlecomer, Coolcullen, and several other places in the county, but the waters have little efficacy.

Soil and Agriculture.—There is but a small portion of Kilkenny unfit for tillage. The hills of the northern district are round-backed and accessible; and the Walsh mountains are for the most part pasturable. The group of Brandon is the only considerable extent of rough land in this county. In the northern part of the Castlecomer coal-tract the soil is a moory turf lying over a stiff whitish clay, which is the poorest district out of the mountain region. From Castlecomer southward the soil is light and friable as far as Kilkenny, and becomes deep, rich, and capable of any tillage towards Gowran and thence to Thomastown. The neighbourhoods of Durrow and Johnstown are good tillage lands, and the valley of Freshford has some of the best ground in the county. The soil of the hilly tract south of Freshford is fitter for pasture, and this is also the character of the right bank of the Nore from Kilkenny to Bennet's Bridge. The district watered by the Owenree has an excellent soil, and yields great crops of wheat. The soil of the hilly country on the south is dry and kind, but it is badly enclosed and destitute of shelter. Some of the best wheat and meadow lands in the south of Ireland are situated in the level tract along the Suir.

About one-third of the level districts is in tillage. In the poor soil of the Castlecomer tract the proportion of tillage land is about five acres in the hundred, and in the Walsh Mountain district about nine. The total productive tillage of the county in 1802 was estimated at 66,361 acres, producing 156,000 barrels of wheat, 80,000 barrels of barley, and 19,500 barrels of bere, 100,000 barrels of oats, and 1,030,000 barrels of potatoes. The sales of grain in the several market-towns in 1826 and 1836 appear from the following table:—

	Barrels of Wheat of 20 stone.		Barrels of Barley of 16 stone		Barrels of Oats of 14 stone.	
	1826.	1836.	1826.	1836.	1826.	1836.
Kilkenny . .	34,000	36,350	1,146	1,909	18,000	36,800
Gowran, Goresbridge, & Graigue	20,396	27,746	10,206	10 676	19,756	7,646
Castlecomer, Ballyragget, & Durrow	3,262	6,522	1,200	26	1,060	1,250
Thomastown, Bennetsbridge, Ennisnag, & Kells	42,054	57,632	4,660	5,262	24,000	6,019
Callan . . .	7,460	11,010	1,390	2,090	3,260	5,827

There are two districts almost wholly occupied by dairy-farmers, the Walsh Mountains and the southern part of the Castlecomer tract. In the southern dairy district the sour milk is used for fattening pigs for the Waterford market: in the northern district the milk is sold, there being no convenient market for pork. More attention is paid to cleanliness by the dairy-farmers of the Walsh Mountains than by the others. Their strainers are usually of hemp, and sometimes of tin: among the northern dairies woollen strainers are generally in use. The wages of agricultural labourers are 8*d.* in winter, and, during the rest of the year, 10*d.* The average number of working days in the year is 145.

Manufactures.—The manufacture of carpets, diapers, and tapestry was introduced into the county by the Countess of Ormonde in 1359. James duke of Ormonde, about the middle of the seventeenth century, established and encouraged, at a great expense, both linen and woollen manufactures; and about the close of the same century the Bessborough family introduced the manufacture of linen into the southern parts of the county. None of these branches of trade however succeeded for any considerable length of time. The manufacture of blankets, which was carried on with great activity at Kilkenny from about 1745 to the beginning of the present century, has also declined. In 1822 there were, in the districts of Cork, Kilkenny, Moate, and Carrick-on-Suir, 3184 persons engaged in this manufacture, 9876 depending on them, 19,322 pieces annually manufactured, of the value of 199,100*l.*, with capital invested in buildings and machinery to the amount of 116,700*l.* At present all these districts do not manufacture to the extent of 20,000*l.* In 1831 the number of weavers of every fabric in Kilkenny county was 502, and of wool-combers two. A coarse frieze for home consumption is made among the peasantry.

In 1792 there were in Kilkenny 37 mills employed in the grinding of wheat and making of flour. The number is at present about the same; but the establishments are greatly increased in size and grinding power. They are chiefly on the Nore, which, between Durrow and Innistioge, drives 22 mills.

Civil Division.—Kilkenny is divided into the baronies of Fassadining, on the north-east, containing the towns of Castlecomer, population in 1831, 2436; Ballyragget, pop. 1629; and Clough, pop. 582: Galmoy, on the north-west, containing the towns of Durrow, pop. 1298; Urlingford, pop. 1366; and Johnstown, pop. 875: Gowran, on the east, containing the towns of Thomastown, pop. 2871; Graigue, pop. 2130; Gowran, pop. 1009; Innistioge, pop. 906; part of Bennet's-bridge, total pop. 426; and Goresbridge, pop. 634: Cranagh, on the west, containing the town of Freshford, pop. 2175: Shillelogher, also on the west, containing part of the town and liberties of Callan, total pop. 6111: Kells, on the south-west, containing the remainder of Callan, the town of Kilmaganny, pop. 514; and the village of Kells, pop. 402: Knocktopher, in the southern centre, containing the villages of Knocktopher, pop. 475, and Stoneyford, pop. 445: Ida, on the south-east, containing the village of Rossbercon, a suburb of New Ross, pop. 369: and Iverk, on the south, containing the town of Pilltown, pop. 634, and several villages. The county of the city of Kilkenny forms a separate division, containing 4 parishes, with a population of 23,741.

Of the above towns the following are corporate:—Callan, said to be by prescription; Gowran, by charter of 6 James I.; Innistioge, by 6 James I.; Kilkenny and Irishtown, by 3 and 7 James I. [KILKENNY, *City*]; and Thomastown, by 1 Mary and 13 James I. Prior to the Union each of the above towns and Knocktopher sent two members to the Irish parliament. The representation is at present limited to two county members and one for the county of the city. In 1836 the county constituency was 1477. The assizes are held at Kilkenny, and the general quarter-sessions at Kilkenny, Castlecomer, and Thomastown. The county court-house and gaol are at Kilkenny, and there is a bridewell at Thomastown. The number of criminal offenders committed to the county gaol in 1836 was 480, of whom 409 were males and 71 females. Of these 175 males and 5 females could read and write, 64 males and 9 females could read only, and 169 males and 57 females could neither read nor write. The police force in 1836 consisted of one resident magistrate, 10 chief constables, 51 constables, 341 sub-constables, and 22 horse of the constabulary; and 2 resident magistrates, 3 chief constables, 18 constables, 122 sub-constables, and 2 horse of the Peace Preservation police; the expense of maintaining whom during the year 1835 amounted to 21,167*l.* 11*s.* 8*d.*, of which 11,284*l.* 18*s.* 3¼*d.* was chargeable to the county. The district Lunatic Asylum is at Carlow. The county infirmary and fever hospital are at Kilkenny, and there are also fever hospitals at Freshford, Kells, Kilmaganny, and Rossbercon, with dispensaries in all the towns and chief villages.

Population Table.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	17,569	..	..	..	..	..	..	97,500
1813	Under Act of 1812 . . .	23,414	..	..	..	..	..	..	134,664
1821	Under Act 55 Geo. III. c. 120	25,949	27,958	..	..	..	77,630	81,086	158,716
1831	Under Act 1 Will. IV. c. 19 .	27,248	28,823	19,727	4,271	4,825	83,090	86,855	169,945

History and Antiquities.—On the partition of Leinster among the daughters of William earl of Pembroke, A.D. 1247 [KILDARE], Kilkenny was allotted to Isabella, the third daughter, who married Gilbert de Clare, earl of Gloucester and Hertford; by him she had issue, among other children, Eleanor, who married Hugh le Despenser the younger, whose grandson Thomas le Spenser sold his castle and manor of Kilkenny to James Butler, third earl of Ormonde, in 1391. The other great proprietors were the families of Grace and Walsh, who possessed the districts of Grace's Country (nearly co-extensive with the barony of Cranagh) and the Walsh Mountains respectively. The former family descend from Raymond le Gros, one of the most distinguished of the Anglo-Norman invaders, who obtained this district with his wife Basilia, sister of Earl Strongbow. The latter are descended from other companions of Strongbow called Walshes or Welshes (in Irish *Brennagh*), from their having originally come from Wales; they were seneschals of the palatinate of Leinster under the De Clares. Both families lost their estates in the war of the Revolution of 1688. The early history of the county is chiefly occupied with the feuds of the family of Ormonde against the houses of Desmond or Kildare, which led to the abolition of their respective war-cries of *Butler-aboo* and *Crom-aboo* by act of parliament in A.D. 1494. The Graces also during this period were engaged in perpetual hostilities with the Fitzpatricks, Kavanaghs, and other Irish families, the tradition of which events still survives among the peasantry of Grace's Country. On the breaking out of the rebellion of 1641 the county of Kilkenny fell into the hands of the Irish with little opposition, Lord Mountgarret, an influential member of the Butler family, taking the lead among the insurgents. Many others of that family espoused the same cause, and suffered extensively by the subsequent confiscations. The bulk of the Butler possessions was however for a time preserved to the family by James earl of Ormonde, who conducted the royalist cause throughout these wars with the highest ability. He was raised to the dignity of a duke after the Restoration, which event he had been very instrumental in bringing about, and was three times lord-lieutenant of Ireland. On the attainder of James, the third duke of Ormonde, in 1715, the title fell into abeyance. The dukedom has not been revived, but the earldom is now enjoyed by a descendant of Butler of Kilcash, brother to the first, or, as he is commonly called, the great duke of Ormonde.

The defection in this county on the accession of King William III. was very general. The forfeitures comprised 30,152 acres of profitable land, of a total estimated value, at that time, of 68,161*l.* 5*s.* 6*d.* The chief attainted persons were Lord Galmoy, Oliver Grace, Robert Walsh, Edmund Morris, and various members of the families of Fitzgerald, Archer, Rothe, Dalton, Shee, Purcell, and Lawless. The chief landed proprietors at present are the earl of Ormonde and Ossory, earl of Carrick, marquis of Lansdowne, earl of Bessborough, Lord Viscount Clifden, Lord Callan, Lord Viscount Mountmorris, Lord Viscount Ashbrooke, earl of Courtown, Sir Edward Loftus, Bart., Sir William Morris, Sir J. Cuffe, Bart., and the families of Flood, St. George, Tighe, Bryan, Murphy, Bunbury, Walsh, Aylward, and Rothe.

Circular stone enclosures of the Pagan æra remain on the summits of the hills of Cloghmanta near Freshford, and Tory Hill, or Slieve Grian, near Kilmacow. The latter appears to have been a sepulchral cairn, enclosing a kistvæn, or stone chamber, on one side of the covering stone of which there is an inscription long supposed to have reference to Baal, but which is now believed to be of a modern date. The covering stone of the cromlech at Kilmogue, in the barony of Knocktopher, is 45 feet in circumference, and is elevated at one end 15 feet from the ground. Another cromlech at Ballyheniberry, in the barony of Iverk, has a covering stone 16 feet long, 10 feet broad, and 3 feet thick. There are numerous similar monuments of smaller dimensions throughout the county. The remains of raths and earthen tumuli are also of frequent occurrence. There are five round towers, one adjoining the cathedral church of St. Canice in Kilkenny, the others at Kilree, Tullocherin, Fertagh, and Aghaviller. Of the monastic ruins, the most extensive and interesting are those of Jerpoint Abbey on the Nore, two miles from Thomastown. This abbey was founded by Donogh, king of Ossory, in 1180, for Cistercian monks, and was liberally endowed. The abbot was a lord of parliament. The ruins occupy three acres, and are a fine specimen of the mixed Anglo-Norman and early English architecture. The more modern portions of the building are in the pointed style of the thirteenth century, and are distinguished by their elegance and lightness. The tombs of the founder and of several ecclesiastics still remain. At Graigue are the extensive remains of a Cistercian abbey, founded in 1212 by William Marshal, earl of Pembroke. A portion of the building has been lately roofed in and converted into a Roman Catholic chapel. There are considerable remains of the Dominican convent at Thomastown, of the Augustinian monastery at Innistioge, and of the Augustinian friaries at Kells and Callan. Of the numerous castles founded by the Anglo-Norman lords, the most considerable is Grandison Castle in Iverk, an antient seat of the Butlers. It has three round towers towards the Suir and two courtyards. The castles of Balleen, Ballyragget, Knocktopher, Gowran, Callan, Urlingford, and several others, belong to the same family. Courtstown Castle, the chief seat of the Graces, was a building of great extent and splendour; but the ruins have now nearly disappeared. There are numerous castles in the barony of Gowran founded by the Purcells. In Knocktopher fifteen castles of the Walshes are enumerated; and throughout the county are the remains of various other fortalices belonging to the families of Brennan, Cantwell, Morris, Curry, Shortall, and Fitzgerald.

Kilkenny is situated in the dioceses of Ossory, Cashel, and Leighlin, under which titles the educational statistics of the district will be found.

The county expenses are defrayed by grand-jury presentments. The amount levied in 1835 was 29,793*l.* 14*s.* 8½*d.* Of this a sum of 2603*l.* 11*s.* 6*d.* was for the public roads of the county at large; 5907*l.* 19*s.* 1*d.* was for the public roads, being the baronial charge; 7609*l.* 19*s.* 1*d.* was for the public establishments and salaries; 11,284*l.* 18*s.* 3¼*d.* was for police; and 2387*l.* 6*s.* 9*d.* for repayment of loans advanced by government.

(*Statistical Survey of Kilkenny*, Dublin, 1802; Brewer's *Beauties of Ireland*; Griffith's *Report on the Leinster Coal Tract*; *Transactions of the Geological Society*, vol. v. Lewis's *Topographical Dictionary of Ireland*, 1838; *Parliamentary Reports and Papers.*)

KILKENNY, a city and county of a city, included in the county of Kilkenny, in Ireland. The county of the city comprises 14,903 Irish or 24,140 statute acres on both sides of the Nore, about midway between Thomastown and Durrow. The city occupies an area of 235 Irish or 380 statute acres, of which about two-thirds are under cultivation. According to the map of the Society for the Diffusion of Useful Knowledge, it is situated in 58° 37′ N. lat and 7° 13′ W. long., and is distant from Dublin 57½ Irish or 73½ statute miles.

Kilkenny, signifying the church of Kenny or Canice,

takes its name from the cathedral church of the diocese of Ossory, founded here about the end of the twelfth century. The place was selected by the early Anglo-Norman invaders for the site of a castle, which, when partly built, was destroyed by Donald O'Brien, king of Thomond, A.D. 1193. As part of the territory acquired by Strongbow by his marriage with the daughter of Dermot MacMurrogh, it devolved on William Marshal, Earl Pembroke, who founded the present castle, A.D. 1195. The castle occupies a commanding site on the west bank of the Nore, which is here about 40 feet high and faced with masonry. The cathedral is seated on a gentle eminence on the same side of the river, at the opposite or northern extremity of the city. The small river Bregah running into the Nore about midway between these points divides the city of Kilkenny Proper from the separate corporation of Irishtown or St. Canice, the former having originally been a dependency on the castle, the latter on the cathedral. A large suburb occupies the opposite side of the river, and is connected with Kilkenny Proper and Irishtown by two handsome bridges. Besides the castle, William Marshal the elder founded the hospital and abbey of St. John, in John's Street, Kilkenny, A.D 1211; and William Marshal the younger founded the Dominican or Black abbey in Irishtown, A.D. 1225. The Franciscan abbey on the bank of the river was also founded by the same family, and completed in 1347. At this time Kilkenny was a place of great importance as a frontier town of the Pale and a place of assembly for councils of the nobility and parliaments. At the parliament held here A.D. 1367, before Lionel, duke of Clarence, was passed the celebrated statute of Kilkenny, by which the Brehon law was legally abolished, although it continued practically in operation until the time of James I. In 1391 James Butler, third earl of Ormonde, purchased the castle and manor from Thomas Le Spenser, to whom the possessions of the family of Marshal had descended; and the title and estate still continue in the family of the purchaser. In 1399 the earl of Ormonde received King Richard II. here, and entertained him with great splendour for fourteen days. In 1400 Robert Talbot, a nephew of the earl, walled in the town, and various grants for murage, pavage, &c. were made to the citizens during the succeeding century. Parliaments and vice-royal courts continued to be held in Kilkenny until the breaking out of the rebellion of 1641, when it became the head-quarters of the Roman Catholic party and the seat of the supreme council appointed to manage their affairs. The council was modelled on the plan of a parliament, consisting of two houses, one composed of temporal peers and prelates, the other of members delegated from counties and borough towns. Both sat in the same chamber, but the lords had a retiring-room for occasional consultation. The meeting was at the house of a Mr. Shee, in the Coal-market, which was standing in 1802. On the 23rd March, 1650, the parliamentary army, commanded by Oliver Cromwell, appeared before the town, which was garrisoned for the Roman Catholic party by Colonel Walter Butler. An attempt was made next day to carry the place by assault, but it failed, and on the 25th a battery was opened on the castle. A breach being effected, the assault was made twice that evening, but without success, and the breach was quickly repaired. Cromwell was about to abandon the siege when the mayor and townsmen admitted his forces into Irishtown. Here the besiegers were again repulsed in endeavouring to make their way through the Franciscan abbey into Kilkenny Proper. On the 28th however Ireton came up with 1500 men, on which the garrison surrendered on honourable terms, Cromwell himself complimenting them on their gallantry. In 1652 Cromwell's first high court of justice sat here, and occupied the same chamber which had been used by the supreme council.

The chief object of antiquity is the cathedral church of St. Canice. It is a cruciform building, surmounted by a low tower: it extends from east to west 226 feet, and from north to south 123 feet, dimensions greater than those of any other church in Ireland, except St. Patrick's and Christ Church, Dublin. The chapel of St. Mary in the north transept serves as parish church. The oldest parts of the building appear to be of the architecture of the early part of the thirteenth century. The nave is divided from the side aisles by pointed arches springing from black marble columns, between which are numerous altar-monuments. The choir with the chancel is 77 feet in length. It is fitted up with varnished oak, and has a noble east window. The whole building had fallen greatly to decay in the beginning of the eighteenth century, but was repaired by Bishop Pococke in 1756, and is now in good preservation. Of the original castle there remain three massive towers worked into large additions, in the French taste of the seventeenth century, made by James, duke of Ormonde, in 1682. The building occupies three sides of a quadrangle, having a garden and fountain in front and a lofty terrace towards the Nore. The principal apartment is the picture gallery 180 feet in length, which contains numerous portraits of historical interest, and commands magnificent views of Kilkenny and the valley of the Nore. The abbey-church of St. John's has been converted into a parish church, and retains a good deal of the character of the original building, which was remarkable for its tall and slender windows pierced so close to one another that the intervals were nearly mullions, from which peculiarity it had the name of 'the lantern of Kilkenny.' Black Abbey has been partly restored and converted into a church for Roman Catholics. The architecture of the western part and of the south transept ranks among the best examples of the modified pointed style of the fourteenth century to be met with in Ireland. The body and tower of the Franciscan friary are still standing, but roofless, and the former has latterly been used as a tennis-court.

Kilkenny was first incorporated by William Marshal the elder, and Irishtown by King Edward IV. Their governing charters are of the 7th and 3rd James I. respectively. The governing body of the corporation of Kilkenny consists of a mayor, aldermen, and 36 common councilmen, by favour of whom the freemen are admitted, and latterly by birth, servitude, and marriage also. The recorder is elected by the governing body. His court has a civil jurisdiction unlimited in amount in causes arising within the precincts of the corporation. The annual revenue of the corporation arises from tithes producing 987*l.* 13*s.* 9¾*d.*, lands producing 830*l.* 17*s.* 9½*d.*, and customs producing about 200*l.* per annum. The annual expenditure is about 1350*l.* The constitution of the corporation, which was originally of a popular character, has been gradually altered, until almost all power is vested in a select body. The governing body of Irishtown consists of a portreeve and burgesses. The burgesses have nominally the election of the portreeve, but he is in reality appointed by the bishop of Ossory. The jurisdiction of the recorder's court does not exceed 40*s.* Irish. The revenue of the corporation, which is about equal to its expenditure, is only 15*l.* per annum. Prior to the Union, Kilkenny and Irishtown returned two members each to the Irish parliament. The representation is now confined to one member for Kilkenny city. In 1836 the number of voters was 808. The right of voting is regulated by 2nd William IV., c. 88. Assizes for the county of the city are held twice a year, and quarter-sessions in rotation with the towns of Castlecomer, Thomastown, and Urlingford. The county and city court-houses are built on the site of an antient castle of the Graces. The city gaol is a small building badly arranged; but that for the county, situated on the west of the town, is spacious and well constructed.

The town is well built, and has a busy and cheerful appearance, particularly that portion of it constituting Kilkenny Proper. The building material is usually stone whitened or dashed with rough-cast. The duties of police are discharged by a Peace Preservation force of one chief constable, three constables, and seventeen sub-constables, the cost of maintaining whom, in 1835, was 712*l.* 15*s.* 10*d.* Up to the year 1836 the provisions of the Lighting and Cleansing Act of 9 George IV., c. 82, had not been put in force in Kilkenny. The environs are of a very pleasing character, and the Mall, extending a mile along the back of the unfinished canal, is an elegant promenade.

The blanket manufacture, although much decayed, is still carried on to a considerable extent. There is a small manufacture of coarse woollen cloth and linens; but the chief trade is in grinding, malting, brewing, and distilling. Tanning and the provision trade are also carried on extensively, and there are great fairs twice a year for wool and black cattle. In 1689 the number of houses in Kilkenny city was 507; in Kilkenny city, including Irishtown, the number of houses in 1777 was 2274; in 1788 the number was 2689, and 2870 in 1802. The following table is for the county of the city —

Population Table.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort . . .	(in 1788) 2689	..	..	..	..	..	..	16,000
1821	Under Act 55 Geo. III. c. 20 . .	3840	..	..	..	..	10,833	12,397	23,230
1831	Under Act 1 William IV. c. 19 . .	3759	4785	1501	1918	1366	10,887	12,854	23,741

The grammar-school or college of Kilkenny is an antient foundation of Pierce Butler, earl of Ormonde and Ossory, and his wife, the Lady Margaret Fitzgerald, in the sixteenth century; and further endowed by the duke of Ormonde in 1684. By the charter granted on the latter occasion the children of the retainers of the duke of Ormonde may be presented for instruction in Latin, Greek, Hebrew, poetry, and oratory, gratis, and the children of townsmen of Kilkenny at half-price; all others to be received according to the rates of the chief schools of Dublin. On the attainder of James, third duke of Ormonde, the privilege of presentation lapsed to the provost and fellows of Trinity College, Dublin. At present the head-master receives an annuity of 140*l*. per annum from the Ormonde family. The number of scholars is about 45. A poor-school for about 150 children of both sexes is supported in St. Mary's parish by a bequest of 100*l*. per annum left by Mr. Evans, and by other contributions amounting to about 60*l*. annually. In the same parish is a poor-school, kept by nuns, for 400 females. A Mechanics' Friend Society, established in 1835, has a library of 700 volumes and a public lecture-room. A subscription library, containing 4000 volumes, with a news-room attached, has been open since 1811. The deposits in the Savings' Bank, established in 1815, amounted in 1835 to 23,784*l*.

(*Statistical Survey of Kilkenny*; Ledwich's *Essay on the Antiquities of Kilkenny*; Brewer's *Beauties of Ireland*; *Parliamentary Reports and Papers*.)

KILLALLA, a bishop's see in the archdiocese of Tuam, in Ireland. It comprises a large part of the county of Mayo, and a portion of the county of Sligo, extending from east to west 57 statute miles, and from north to south 27 miles. The chapter consists of a dean, precentor, and archdeacon, with five prebendaries. In 1792 there were in the diocese 25 parishes, constituting 11 benefices, having 12 churches of the Establishment. In 1834 the numbers were—parishes 27, benefices 13, churches of the Establishment 13, other places of Protestant worship 2, Roman Catholic places of worship 30. In the latter year the gross population of the diocese was 144,289, of whom there were 7729 members of the Established Church, 38 Presbyterians, 139 other Protestant Dissenters, and 136,383 Roman Catholics, being in the proportion of 18¼ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 129 daily schools, educating 7413 young persons of both sexes, being in the proportion of 5·13 per cent. of the entire population under daily instruction, in which respect Killalla ranks twenty-seventh among the 32 dioceses of Ireland. Of the above schools, in 1834, there were four in connection with the National Board of Education.

St. Muredach, the son of Eochard, was consecrated first bishop of the see by St. Patrick, about A.D. 440. It has been held in commendam with that of Achonry since the accession of Meyler Magrath to the bishopric, A.D. 1607. The last bishop of the united diocese was Doctor James Verschoyle, on whose death in 1833 these sees became annexed to the archiepiscopal see of Tuam, according to the provisions of the 3 & 4 William IV., c. 37. The see lands, now vested in the Ecclesiastical Commissioners, comprise 33,668½ statute acres; the gross annual revenue, on an average of three years ending December, 1833, was 2600*l*. 11*s*. 10½*d*.

Killalla is situated at the mouth of the river Moy, and has a population of 1125. It is a place of some trade in the export of grain and the manufacture of coarse linen, but from its vicinity to the more thriving town of Ballina [MAYO], it has latterly declined. The cathedral, which was repaired in 1817, is an old building, and is used also as the parish church.

The diocese of Achonry extends from north-east to south-west 35 statute miles, and is 27 statute miles broad. It comprises a large portion of the county of Sligo, and a part of the county of Mayo, and bounds the diocese of Killalla on the south and east. The chapter consists of a dean, precentor, and archdeacon, with three prebendaries. In 1792 there were in the diocese 27 parishes, constituting nine benefices, having eight churches of the Establishment. In 1834 the numbers were—parishes 25, benefices 13, churches of the Establishment 11, Roman Catholic places of worship 35. In the latter year the gross population of the diocese was 114,422, of whom there were 5417 members of the Established Church, 143 Presbyterians, 27 other Protestant Dissenters, and 108,835 Roman Catholics, being in the proportion of 19½ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 107 daily schools, educating 8498 young persons of both sexes, being in the proportion of 7·43 per cent. of the entire population under daily instruction, in which respect Achonry ranks seventeenth among the 32 dioceses of Ireland. Of the above schools, in 1834, 14 were in connection with the National Board of Education.

Achonry is a mean hamlet, in the barony of Leney, in the county of Sligo. The cathedral is used as the parish church. The see lands comprise 11,784 acres, from which the annual average income is 1481*l*. 6*s*. 9½*d*.

(Ware's *Bishops*; Beaufort's *Memoir of a Map of Ireland*; *Parliamentary Returns*.)

KILLALOE, a bishop's see in the archiepiscopal province of Cashel, in Ireland. The diocese extends upwards of 80 Irish or 100 statute miles, through the counties of Clare and Tipperary into the King's County; and includes also a small part of Queen's County, Galway, and Limerick. It varies in breadth from 7 to 25 miles Irish. The chapter consists of a dean, precentor, chancellor, treasurer, and archdeacon, and five prebendaries. In 1792 there were in the diocese 119 parishes, constituting 42 benefices, having 35 churches of the Establishment. In 1834 the numbers were—parishes 108, benefices 60, churches of the Establishment 56, other places of Protestant worship 5, places of Roman Catholic worship 111. In the latter year the gross population of the diocese was 379,076, of whom there were 19,149 members of the Established Church, 16 Presbyterians, 326 other Protestant Dissenters, and 359,585 Roman Catholics, being in the proportion of 18¼ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 349 daily schools, educating 23,152 young persons of both sexes, being in the proportion of 6·19 per cent. of the entire population under daily instruction, in which respect Killaloe ranks twenty-fourth among the 32 dioceses of Ireland. Of the above schools, in 1834, 13 were in connection with the National Board of Education.

Killaloe, a small town on the Shannon, near the southern extremity of Loch Derg, takes its name from St. Lua, called Mo-Lua, who founded a cell there about the beginning of the seventh century. St. Flannan, his disciple, was consecrated first bishop of this see, at Rome, about A.D. 639. About A.D. 1195 the antient sees of Innis-Cathy and Roscrea were annexed to Killaloe, and in 1752 Killfenora was added. The united diocese of Clonfert and Kilmacduagh, having become vacant, is now, by the 3 & 4 William IV., c. 37, also annexed to Killaloe. The see lands of the diocese comprise 7528 acres, of an average annual value in 1831 of 4532*l*. 9*s*. 1*d*. The cathedral, which was erected by Donald O'Brian, king of Limerick, in 1160, is a crucifor-

building with a square tower. The episcopal palace is a handsome residence in a well planted demesne overlooking the Shannon, which here runs rapidly over a rocky channel. The stone-roofed cell of St. Molua stands near the cathedral. It is remarkable as a specimen of the building of the seventh century.

(Ware's *Bishops*; Beaufort's *Memoir; Parliamentary Returns.*)

KILLARNEY, a market and post-town in the barony of Magonihy and county of Kerry, in Ireland; distant from Dublin 147 Irish or 187 statute miles.

The establishment of Iron works by Sir William Petty on the eastern shore of the Lower Lake of Killarney led to the erection of the town, which is distant from the lake about a mile and a half. It continued a small place till about the middle of the last century, when the proprietor, Lord Kenmare, invited several respectable families to settle there, and erected some houses for the linen manufacture in the vicinity. Soon after a new street, now the High Street of the town, was built, and a commodious hotel erected for the accommodation of the numerous visitors who about this time began to be attracted by the beauty of the neighbouring scenery. The working of the copper-mines at Ross and Muckruss contributed to the increasing prosperity of the town; and it has now become a place of permanent residence for many inhabitants of the better class, as well as a favourite resort for great numbers of tourists each summer and autumn. It consists of two principal streets at right angles, with several smaller streets leading from them. At the southern end of the main street is the best part of the town, called Kenmare Place, near which is the entrance to Lord Kenmare's demesne, a finely timbered park, which greatly ornaments the approach to Killarney on this side. In the main street are two excellent hotels. Besides the church, which is a respectable old building, there is a large Roman Catholic chapel, a nunnery, and two subscription reading-rooms. The general appearance of the town is neat, and, during the summer and autumn, very animated.

Quarter-sessions are held here four times in the year, besides weekly petty-sessions. The court-house is a handsome stone edifice, having a bridewell attached. The old court-house has been converted into a theatre. Balls are occasionally given in the upper part of the market-house, which is an old building, now chiefly appropriated to the sale of linens. There are a fever-hospital, dispensary, and almshouse for the aged women, the last supported by the countess of Kenmare. There is a free-school for 400 males, under the superintendence of the Roman Catholic clergymen, and another for 300 females, attached to the nunnery, both of which are liberally patronized by the Kenmare family. There is also a free-school for 44 males and 34 females, under the superintendence of the clergymen of the Established Church, and a national school.

The number of inhabited houses in Killarney, in 1831, was 936; and of inhabitants 7910, of whom 6715 were in the parish of Killarney, and 1195 in the parish of Aghadoe.

(Smith's *Antient and Present State of the County of Kerry*; Frazer's *Guide-book for Ireland*, Dublin, 1838; *Parliamentary Reports and Papers.*)

KILLARNEY LAKES. [KERRY.]

KILLAS, the local name of a group of rocks in Cornwall, ranked by geologists with the clay-slate, or grauwacke slate of other countries. The term is perhaps most properly applied to denote fissile argillaceous rocks, such as are usually called clay-slate; but it is often extended to other earthy compounds allied to these by geological position. (See Rev. J. Conybeare, *Ann. Phil.*, new series, vol. vi.) Near granite the killas is supposed by many geologists to undergo great alterations of character, to become 'metamorphic,' so as to assume more or less of the characters of pyrogenous rocks. In these 'altered' rocks lies a great part of the mineral wealth of Cornwall; tin and copper veins abound in them, as well as in the contiguous granite, to whose influence their mineral characters are ascribed. Dr. Borlase, in his work 'On the Geology of Cornwall,' assigns to these rocks the title of Cornubianite.

KILLENITE, a mineral which occurs both crystallised and massive. The crystals are imperfect: the primary form appears to be a rhombic prism. Cleavage parallel to the lateral faces and short diagonal; fracture uneven; structure lamellar; colour greenish and brownish yellow; streak yellowish-white; lustre glimmering, dull, vitreous; translucent; opaque; specific gravity 2·698; hardness 4·0; scratched by the knife; frangible.

By the blow-pipe becomes white, swells up, and fuses into a colourless enamel.

It occurs in granite veins at Killeny near Dublin, and is stated by Dr. Thomson to consist of

Silica	49·08
Alumina	30·60
Potash	6·72
Oxide of iron	2·27
Water	10·
	98·67

KILLFENORA, a bishop's see in the archiepiscopal province of Cashel, in Ireland. It is confined to the baronies of Burrin and Corcomroe, in the county of Clare, and extends only 23 statute miles by 11. The chapter is the same with that of Killaloe, excepting the prebendaries. In 1792 it contained 19 parishes, constituting eight benefices, having three churches of the Establishment. In 1834 the numbers were—parishes 19, benefices 6, churches of the Establishment 3, other places of Protestant worship 1, Roman Catholic places of worship 15. In the latter year the gross population of the diocese was 36,405, of whom there were 235 members of the Established Church, 4 Presbyterians, and 36,166 Roman Catholics, being in the proportion of 151¼ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 28 day-schools, educating 2256 young persons of both sexes, being in the proportion of 6·14 per cent. of the entire population under daily instruction, in which respect Killfenora ranks twenty-fifth among the 32 dioceses of Ireland. Of the above schools, in 1834, there were not any in connection with the National Board of Education.

There are no authentic accounts of this see, which was antiently called Fenabore and Cellumabrach, till A.D. 1265, when one Christian was bishop. Killfenora was first united to Clonfert A.D. 1741, and subsequently to Killaloe A.D. 1752, which union still subsists. The see lands comprise 9237 acres. The income is included in that of Killaloe. The cathedral serves as a parish church; it is a respectable building, with a massive square tower.

(Ware's *Bishops*; Beaufort's *Memoir; Parliamentary Returns.*)

KILLINEY, a village near Dublin, where the junction of the granite and schist of the Wicklow mountains may be advantageously observed. The granite is hard, and contains plumose mica. The edges of the schistose strata repose on a basis of granite. 'The schist is much contorted, and sometimes so convoluted as to form concentric crusts. At the line of junction the schist abounds in crystals of andalusite grouped in a stelliform manner. Numerous veins issue from the granite, and intersect the micaceous schist. These veins frequently contain fragments of micaceous schist.' (Dr. Scouler, *Memoranda of Objects of Geological Interest in the Vicinity of Dublin*, 1835.)

KILMACDUAGH, a bishop's see in the archiepiscopal province of Tuam, in Ireland. It lies wholly within the county of Galway, extending along the south-western boundary of that county 23 statute miles by 15. The chapter consists of a dean, provost, chancellor, archdeacon, and two prebendaries. In 1792 it was divided into 60 parishes, constituting 15 benefices, having 14 churches of the Establishment. In 1834 the numbers were—parishes 21, benefices 4, churches of the Establishment 4, other places of Protestant worship 1, places of Roman Catholic worship 14. In the latter year the gross population of the diocese was 46,132, of whom 656 were members of the Established Church, and 45,476 were Roman Catholics, being in the proportion of 69¼ Roman Catholics to one Protestant nearly. In the same year there were in the diocese 53 schools, educating 3551 young persons of both sexes, being in the proportion of 7·70 per cent. of the entire population under daily instruction, in which respect Kilmacduagh stands sixteenth among the 32 dioceses of Ireland. Of the above schools, in 1834, there were not any in connection with the National Board of Education.

The see was founded by Colman, the son of Duach, a relative of Guair, king of Connaught, who endowed the bishopric with large possessions about the end of the sixth century. Stephen Kerovan, bishop of Kilmacduagh, was translated to Clonfert A.D. 1582, since which time these sees have been united. By the 3 & 4 William IV., c. 37,

the united dioceses are now annexed to the see of Killaloe and Killfenora, and their temporalities vested in the Ecclesiastical Commissioners. The see lands consist of 3950½ statute acres, producing an average annual income of 875*l.* The cathedral, a modern edifice, is situated in the town of Gort. There are some remains of the abbey founded by St. Colman at Kilmacduagh, and a round tower which leans remarkably from the perpendicular.

(Ware's *Bishops;* Beaufort's *Memoir; Parliamentary Returns.*)

KILMARNOCK, a market-town and parish in the district of Cunningham and shire of Ayr, 65 miles south-west by west from Edinburgh. It is surrounded by a fertile and populous district, and is well supplied with coal from the neighbouring mines. Its situation however is low, and up to the beginning of the present century it was considered the most irregularly-built town in this part of Scotland. During this century acts of parliament have been passed for cleansing, lighting, and paving the streets, and at present it contains some handsome modern houses, a bank, bridewell, workhouse, and commodious grammar-school. Kilmarnock is the principal manufacturing town of Ayrshire for woollen and cotton goods, and is more particularly noted for the weaving of shawls and carpets, of which it exports so large a quantity, that the annual value of these two branches of manufacture is alone estimated at 100,000*l.*

Kilmarnock was erected into a free burgh of barony by the charter of James VI. in 1591, and anew by the charter of Charles II. in 1672. The property of the burgh is valued at 7892*l.*, its revenue at 380*l.*, its expenditure at 256*l.*, and its debt at 3675*l.* The population of the burgh and parish in 1831 was 18,093, having been increased by 5324 persons in the ten preceding years, in consequence of the general improvement which had taken place in the trade and manufacture of the town within that period. In union with Port Glasgow, Kilmarnock now returns one member to parliament. (*Local Reports of Commissioners on Scotch Corporations; Beauties of Scotland,* &c.)

KILMORE, a bishop's see in the archiepiscopal province of Armagh, in Ireland. It comprises portions of the counties of Fermanagh, Leitrim, and Cavan, and a small part of the county of Meath, and extends 74 statute miles in length by from 13 to 25 in breadth. It has a dean and archdeacon, but no chapter. In 1792 it was divided into 39 parishes, constituting 30 benefices, having 36 churches. In 1834 the numbers were—parishes 37, benefices 38, churches of the Establishment 45, other places of Protestant worship 5, places of Roman Catholic worship 76. In the latter year the gross population of this diocese was 296,305, of whom there were 46,879 members of the Established Church, 8736 Presbyterians, 97 other Protestant Dissenters, and 240,593 Roman Catholics, being in the proportion of 4¼ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 446 schools educating 30,623 young persons of both sexes, being in the proportion of 10·33 per cent. of the entire population under daily instruction, in which respect Kilmore ranks second among the 32 dioceses of Ireland. Of the above schools 23 were, in 1834, in connection with the National Board of Education.

Prior to A.D. 1454 the bishops of this district took their title from Triburna, an obscure village of the territory of Brefre. In that year Andrew MacBrady, bishop of Triburna, by the consent of Pope Nicholas V., erected the parish church of St. Feliney of Kilmore into a cathedral; from which time he and his successors have had the present title. John Garvey, who was promoted to this see in 1585, was the first Protestant bishop. After his death in 1589, the see lay vacant until 1603. From 1629 to 1641 it was filled by William Bedell, a prelate of great piety and learning. [BEDELL.] By the 3rd and 4th William IV., c. 37, this diocese becomes united with that of Elphin on either falling vacant. On this union, the temporalities of Elphin vest in the Ecclesiastical Commissioners. On the archiepiscopal see of Tuam becoming void, the bishopric of Ardagh, hitherto united to it, will also be annexed to Kilmore. The see lands comprise 28,531 acres, producing an average annual income of 7477*l.* 17*s.* 0½*d.* The antient parish church of Kilmore serves as the cathedral. The bishop's palace is a large mansion situated in a fine demesne near the town of Cavan.

(Ware's *Bishops*; Beaufort's *Memoir; Parliamentary Returns.*)

KIMBOLTON [HUNTINGDONSHIRE.]

KIMCHI, DAVID, a very celebrated Jewish rabbi, was born in the twelfth century, in the south of France, and passed the greater part of his life at Narbonne. His father, Joseph Kimchi, and his brother Moses Kimchi, also enjoyed much reputation among their contemporaries: they both wrote several works on Hebrew grammar and commentaries on the Scriptures; but none of them have been printed with the exception of 'A Commentary on the Life of Ezra,' by Moses Kimchi, printed in the Rabbinical Bible of Venice, 1549; and also a Hebrew Grammar by the same author, Venice, 1624.

David Kimchi has always been regarded by the Jews as one of their most illustrious rabbis. He possessed such great influence among his contemporaries, that he was chosen, in 1232, arbiter of the controversy which had subsisted for some years between the Spanish and French rabbis respecting the opinions of Maimonides. He died about the year 1240.

The most important of his works are:—a Hebrew Grammar, entitled מכלול (*Michlol*), that is, 'Perfection,' Venice, 1545; Leyden, 1631; and frequently reprinted; 'A Dictionary of Hebrew Roots,' Naples, 1490; Venice, 1529, 1552; &c. Kimchi also wrote commentaries on almost all the books of the Old Testament: the most valuable are said to be those upon Isaiah. Many of these commentaries have been printed separately; the whole of them were published by Breithaupt, Gotha, 1713, 3 vols. 4to.

KINCARDINESHIRE, or the **MEARNS**, as it is commonly called, is a maritime county of Scotland, situated between 56° 47′ and 57° 8′ N. lat., and between 2° 5′ and 2° 45′ W. long. On the north and north-west it is bounded by Aberdeenshire; on the south and south-west by Forfarshire, and on the east by the ocean. Its greatest length from the bay of Aberdeen on the north to the mouth of the Esk on the south is about 30 miles; and its greatest breadth from Dunnotar Castle on the east to Mount Battock on the west is rather less than 20 miles. It contains 382 square miles, or 244,480 acres, of which 1280 are water: half the county is supposed to consist of cultivated land, woodland, improvable moor, &c., and half of mountains, hills, &c.

The Grampian range, whose extremity forms the promontory of Girdleness in this county, occupies the western, central, and more northern parts of Kincardineshire. Mount Caerloch, the highest summit in this county, rises 1890 feet above the sea level. To the south of the Grampians the county descends into what is locally termed the 'How or Hollow of the Mearns,' which is the eastern extremity of Strathmore. Strathmore commences at Stonehaven in this county and extends in a south-westerly direction as far as the Frith of Clyde. It contains about 50,000 acres of comparatively low, fertile, and generally well-cultivated land, comprising about 7000 acres of thriving plantations. Along the coast, from the North Esk river to Stonehaven, the soil consists chiefly of a deep strong loam on a clay bottom, and about 32,000 acres of this district are in a high state of cultivation, the remainder being occupied with pasture, moor, and woodland. A third arable district is comprised within the narrow valley of the Dee. In 1807 the stock of cattle was estimated at 24,825 head; of which 6236 were milch cows, and 5280 calves; and the sheep stock at 24,957, exclusive of lambs. The average rent of land in 1810 was 13*s.* 2*d.* an acre, and the annual value of real property as assessed in 1815 was 94,861*l.*; but since then many improvements have been introduced, and prosecuted with extraordinary spirit, and the value of the land proportionally augmented; thus in the parish of Bervie, the rent of the *Haugh* lands adjoining the sea is about 5*l.* per acre. The average rate of wages in the parish of Garvock for married servants employed in agriculture by the half-year is, for a man 5*l.* 10*s.*, and for a boy 1*l.* 15*s.*, both summer and winter. The practice of cutting down the crops at a fixed price per acre, usually 10*s.*, is becoming very prevalent. The ordinary duration of leases is 19 years. The tenant is bound to good husbandry, though generally allowed to consult his own interest, except where very unfair dealing appears. Farm buildings are but indifferent, and there is a general want of enclosures throughout the county. The people are for the most part cleanly in their persons, orderly in their conduct, and regular in their religious duties.

The mineralogy of this county is not of great importance. In the parish of Laurencekirk and many other

places there are lime-quarries, and as the stone is of excellent quality, a more abundant supply of fuel is all that is wanted to render them of great value.

The principal rivers are the Dee on the north, and the North Esk [FORFAR] on the south. The other streams, the Dye, Cowie, Carron, Bervie, and Luther, are small, but several of them contain valuable salmon fisheries. The cod and ling fishery along the coast commences in October and closes in July; and the haddock, skate, and turbot fishery, which is carried on with great activity, usually begins on the first of May, and closes about the middle of July. The herring-fishery has declined, in consequence, it is said, of the fish having forsaken that part of the coast. The weaving of dowlas, household linen, &c. is the chief manufacture of the county, and employs about 700 men. The county is divided into 21 parishes, the aggregate population of which in 1831 was 31,431, forming 7136 families, whereof 2976 were employed in agriculture, 2281 in trade, handicraft, &c., and 1879 not comprised in the preceding classes. In all the parishes there are, beside the parochial-school, several unendowed private schools, wherein writing, arithmetic, and English grammar are taught. The county returns one member to Parliament. The principal towns are Stonehaven, the county town, Bervie [BERVIE], Johnshaven, and Laurencekirk. Of these towns, Bervie unites with Montrose, Aberdeen, Brechin, and Aberbrothwick in returning one member to parliament.

The old town of Stonehaven is reputed a burgh of barony, but the charter of erection is not known to exist, neither has its date been ascertained. It is conveniently situated near the mouth of the Carron river, and possesses an excellent harbour, sheltered on the south-east by a high rock, which runs out into the sea, and on the north-east by a quay, well adapted for the loading and unloading of goods To the north of the old town, but adjoining to it, is the new town of Stonehaven, which in point of wealth and population is of much greater importance than the other. It has risen suddenly, and is rapidly increasing, but it is neither lighted nor watched, and very imperfectly cleaned, from want of power to remove the dunghills kept at the doors of the inhabitants. The old town has long been supplied with water from private wells, and a company has been formed within the last few years for the supply of the new town. According to the local reports of Commissioners in 1836, the wealthier part of the inhabitants were then very anxious to adopt the new Police Act, but the majority of the town were opposed to all assessment. The population, which in 1835 was estimated at 3050, is rapidly increasing. This is attributed partly to the cultivation of waste lands and partly to the increase of manufactures.

(*New Statistical Account of Scotland; Beauties of Scotland; Parliamentary Papers*, &c.)

KING. The primary use of this word is to denote a person in whom is vested the higher executive functions in an independent state, together with a share, more or less limited, of the sovereign power. The state may consist of a vast assemblage of persons, like the French or the Spanish nation, or the British people, in which several nations are included; or it may be small, like the Danes, or like one of the states while in England there were seven states independent of each other; yet if the chief executive functions are vested in some one person who has also a share in the sovereign power, the idea represented by the word *king* seems to be complete. It is even used for those chiefs of savage tribes who are a *state* only in a certain loose and colloquial sense of the term.

It signifies nothing whether the power of such a person is limited only by his own conscience and will, or whether his power be limited by certain immemorial usages and written laws, or in any other way; still such a person is a king.

Nor does it signify whether he succeed to the *throne*, the seat on which he sits when in the exercise of his royal authority, by descent and inheritance on the death of his predecessor, just as the eldest son of a peer succeeds to his father's rank and title on the death of the parent, or is elected to fill the office by some council or body of persons selected out of the nation he is to govern, or by the suffrages of the whole nation. Thus there was a king of Poland, who was an elected king; a king of England, who succeeded by hereditary right.

Still in countries where the kingly office is hereditary, some form has always been gone through on the accession of a new king, in which there was a recognition on the part of the people of his right, a claim from them that he should pledge himself to the performance of certain duties, and generally a religious ceremony performed, in which anointing him with oil and placing a crown upon his head were conspicuous acts. By this last act is symbolised his supremacy; and by the anointing a certain sacredness is thrown around his person. These kinds of ceremonies, we believe, are found in all countries in which the sovereign, or the person sharing in the sovereign power, is known as king; and these ceremonies seem to make a distinction between the succession of an hereditary king to his throne and the succession of an hereditary peer to his rank.

The distinction between a king and an emperor is not very clearly defined. *Emperor* comes from *imperator*, a title used by the sovereigns of the Roman empire. When that empire became divided, each sovereign, that of the West and that of the East, called himself an emperor. These emperors claimed a kind of supremacy over other sovereigns. The emperor of Germany was regarded as a kind of successor to the emperors of the West, and the emperor of Russia (who was and is often called the Czar), is, with less pretension to the honour, sometimes spoken of as successor to the emperor of the East. But we speak of the emperor of China, where emperor is clearly nothing more than king, and we use emperor rather than king only out of regard to the vast extent of his dominions. Napoleon called himself an emperor; and we sometimes speak of the British empire. [EMPEROR.]

The word *king* is of pure Teutonic origin, and is found slightly varied in its literal elements in most of the languages which are sprung from the Teutonic The French, the Italian, the Spanish, and the Portuguese, on the other hand, have chosen to continue the use of the Latin word *rex*, only slightly varying the orthography according to the analogies of each particular language. *King*, traced to its origin, seems to denote one to whom superior knowledge had given superior power, allied, as it seems to be, to *know*, *con*, *can*; but on the etymology, or what is the same thing, the remote origin of the word, different opinions have been held, and the question may still be considered undetermined.

There are two or three other words employed to designate the sovereigns of particular states, in using which we adopt the word which the people of those states use, instead of the word *king*. Thus there is the *Shah* of Persia, the *Dey* of Algiers, and the grand *Sultan*. In the United States of America very limited powers are given to one person, who is elected to enjoy them for a short period with the title of *President*. A *Regent* is a temporary king.

A personage in whom such extraordinary powers have been vested must of necessity have had very much to do with the progress and welfare of particular nations, and with the progress of human society at large. When held by a person of a tyrannical turn of mind, they might be made use of to repress all that was great and generous in the masses who were governed, and to introduce among them all the evils and miseries of slavery. Possessed by a person of an ambitious spirit, they might introduce unnecessary quarrelling among nations to open the way for conquest, so that whole nations might suffer for the gratification of the personal ambition of one. The lover of peace and truth, and human improvement and security, may have found in the possession of kingly power the means of benefiting a people to an extent that might satisfy the most benevolent heart. But it must now by the long experience of mankind have become sufficiently apparent that for the king himself and for his people it is best that there should be strong checks in the frame of society on the mere personal and private disposition of kings, in the forms of courts of justice, councils, parliaments, and other bodies or single persons whose concurrence must be obtained before anything is undertaken in which the interests of the community are extensively involved. In most countries, as in England, there are controlling powers such as these, and even in countries in which the executive and legislative power are nominally in some one person absolutely, the acts of that person are virtually controlled, if by nothing else, by the opinion of the people, a power constantly increasing as the facilities of communication and the knowledge of a people advance.

Nothing can be more various than the constitutional checks in different states on the kingly power, or, as it is more usually called in England, the royal *prerogative*. Such a subject must be passed over in an article of confined limits

such as this must be, else in speaking of the kingly dignity it might have been proper to exhibit how diversely power is distributed in different states, each having at its head a king. But the subject must not be dismissed without a few observations on the kingly office (now by hereditary descent discharged by a queen) [QUEEN], as it exists among ourselves.

The dawn of the English kingly power is to be perceived in the establishment of Egbert, at the close of the eighth century, as king of the English. His family is illustrated by the talents and virtues of Alfred, and the peacefulness and piety of Edward. On his death there ensued a struggle for the succession between the representative of the Danish kings, who for awhile had usurped upon the posterity of Egbert, and William then duke of Normandy. It ended with the success of William.

This is generally regarded as a kind of new beginning of the race of English kings, for William was but remotely allied to any of the Saxon kings. In his descendants the kingly office has ever since continued; but though the English throne is hereditary, it is not hereditary in a sense perfectly absolute, nor does it seem to have been ever so considered. For when Henry I. was dead, leaving only a daughter, named Maud, she did not succeed to the throne; and when Stephen died, his son did not succeed, but the crown passed to the son of Maud. Again, on the death of Richard I. a younger brother succeeded, to the exclusion of the son and daughter of an elder brother deceased. Then ensued a long series of regular and undisputed successions; but when Richard II. was deposed, the crown passed to his cousin Henry of Lancaster, son of John of Gaunt, son of Edward III., though there were descendants living of Lionel, duke of Clarence, who was older than John among the children of Edward III. When the rule of Henry VI. became weak, the issue of Lionel advanced their claim. The struggle was long and bloody. It ended in a kind of compromise, the chief of the Lancastrian party taking to wife the heiress of the Yorkists. From that marriage have sprung all the later sovereigns, and the principle of hereditary succession remained undisturbed till the reign of King William III., who was called to the throne on the abdication of James II., when an act was passed excluding the male issue of James, the issue of his sister the duchess of Orleans, and the issue of his aunt the queen of Bohemia, with the exception of her youngest daughter the Princess Sophia and her issue, who were Protestants. On the death of Queen Anne this law of the succession took effect in favour of King George I., son of the Princess Sophia.

Now the heir succeeds to the throne immediately on the decease of his predecessor, so that the king, as the phrase is, never dies. But it is supposed that antiently there was a short intermission, and that the whole of the royal power was not possessed till there had been some kind of recognition on the part of the people.

At the coronation of the king he makes oath to three things:—that he will govern according to law; that he will cause justice to be administered; and that he will maintain the Protestant church.

His person is sacred. He cannot by any process of law be called to account for any of his acts. His concurrence is necessary to every legislative enactment. He sends embassies, makes treaties, and even enters into wars without any previous consultation with parliament. He nominates the judges and the other high officers of state, the officers of the army and navy, the governors of colonies and dependencies, the bishops, deans, and some other dignitaries of the church. He calls parliament together, and can at his pleasure prorogue or dissolve it. He is the fountain of honour: all hereditary titles are derived from his grant. He can also grant privileges of an inferior kind, such as rights of exclusive trading, and of markets and fairs.

This is but a very slight sketch of the power inherent in the kings of England; but the exercise of any or all of these powers is limited by two circumstances: first, the king cannot act politically without an agent, and this agent is not protected by that irresponsibility which belongs to the king himself, but may be brought to account for his acts if he transgress the law; and, secondly, the constant necessity which arises of applying to parliament for supplies of money gives to that body virtually such a control over the exercise of the royal prerogative, as amounts to a necessity of obtaining its concurrence in any public measure of importance. [PARLIAMENT.]

KING, WILLIAM, born 1650, died 1729, a native of Ireland, and a bishop and afterwards an archbishop in the Irish church. He is the author of two works on subjects of deep importance. One of these, 'The Inventions of Men in the Worship of God,' was intended to reconcile the Presbyterians of Ireland to the episcopal form of church order. But his greater work is his treatise on that difficult subject the Origin of Evil, which is written in Latin. His great object is to show that the existence of evil may be accounted for consistently with still acknowledging that God is great and good. These works excited much attention when they appeared, and the latter was attacked by two eminent foreigners, Bayle and Leibnitz, to whom he made no reply. But he left among his papers notes of answers to their arguments, and these were given to the world after his death by Dr. Edmund Law, bishop of Carlisle, together with a translation of the treatise itself. He printed also a sermon on the consistency of Divine Predestination and Fore-knowledge with the Freedom of Man's Will.

In politics he was a true friend to the Revolution. He was made dean of St. Patrick's, the first considerable piece of preferment which he enjoyed, in 1688. In 1691 he was made bishop of Derry, and in 1702 archbishop of Dublin. He was through life held in high esteem as a man, as well as in his character of a prelate and writer on theology.

KING GEORGE'S SOUND is situated on the south coast of Australia, not far from the south-western extremity of that continent, in 35° 6′ 20″ S. lat. and 118° 1′ E. long. It consists of an outer sound and two inner basins or harbours, which are perfectly land-locked and afford every security for ships. The northern basin, called Oyster Harbour, though spacious, is full of shoals, and has scarcely water enough to allow an approach to the beach: there is also a bar of sand fronting the entrance, which has never more than thirteen feet and a half of water. The other basin, called Princess Royal Harbour, is situated on the west side of the Sound; vessels of a considerable size may enter it, and ride at anchor close to the shore in perfect security. As there is no harbour within a great distance of it, either on the southern or western coast of Australia, which offers such advantages as King George's Sound, colonists were sent there from Sidney as early as 1826, and this settlement has been of great advantage to the colony of the Swan River, which was settled at a later date. It is very conveniently situated for the purposes of refreshment and refitting vessels bound to Cook's Land (New South Wales) and Tasmania (Van Diemen's Land), and is frequently resorted to by sealing vessels. The neighbouring coast to the eastward is fringed with numerous rocks and islands, upon which many seals of the black furred species are found. The country about it is partly hilly and partly level, and covered with swamps; it is of moderate fertility, but enjoys a fine climate and a sufficiency of rain for all the purposes of vegetation. The natives resemble those in the neighbourhood of Sidney, and are friendly disposed to the settlers. (Flinders; Nind, in *Journal of London Geogr. Society*, vol. i.)

KINGFISHERS, *Halcyonidæ*, a family of the *Fissirostral* tribe, of the order *Insessores*, or Perching Birds, according to the system of Mr. Vigors. [INSESSORES.]

In Willughby's 'Ornithology,' edited by John Ray, the 'Kingfisher—*Ispida an veterum Alcyon?*' is placed at the head of 'Land-Birds that feed upon Fish.'

Ray, in his 'Synopsis,' gives the bird the same title and position; but the heading varies a little from that of Willughby; for Ray makes the Kingfisher the first of his *Aves terrestres, aquas frequentantes, rostris longis, piscivoræ.*

Brisson arranged the Kingfishers (*Martin-pêcheurs*) in company with the Todies, as the two genera forming the third section of his fourteenth order, consisting of those birds which have the middle of the three anterior toes united to the external one up to the third joint, and to the internal one up to the first.

Linnæus placed the Kingfishers under his order *Picæ*, between *Todus* and *Merops*, with the generic appellation of *Alcedo*, and the following definition:—'*Bill* trigonal, thick, straight, and long. *Tongue* fleshy, very short, flat, and acute. *Feet* gressorial in most.'

Latham's second order, *Picæ*, is divided into three sections The third of these consists of birds with gressorial feet, and consists of the Motmots, the Hornbills, the Kingfishers, the Todies, and the Bee-eaters.

Lacépède's thirteenth subdivision consists of birds whose

external toes are united almost througnout their length (*Platypodes*): his seventeenth order (which, with the sixteenth, eighteenth, nineteenth, and twentieth, comes under this subdivision), consists of the genera *Alcedo* and *Ceyx*.

The tenth and last family of M. Duméril's second order (*Passereaux*) consists of the *Tenuirostres* or *Leptorhamphes*. It contains many genera, the Kingfishers, the Todies, the Bee-eaters, the Humming-birds, the Creepers, the Hoopoes, &c.

The fourth order in the method of M. Meyer comprises the genera *Merops* and *Alcedo* only.

Illiger's *Ambulatores* form his second order, the first division of which, the sixth in relation to the consecutive numbers, is termed *Angulirostres*. This division comprehends the genera *Alcedo* and *Merops* only. It is preceded by the *Syndactyli*, the last division of his first order, *Scansores*, and the *Syndactyli* consist but of one genus, *Galbula*. It is immediately succeeded by the *Suspensi*; and *Trochilus* is the only genus of this division.

Cuvier's *Syndactyles*, the fifth division of his second order, *Passereaux*, comprise the genera *Merops*, *Prionites*, (Motmots), *Alcedo*, *Ceyx*, *Todus*, and *Buceros*.

M. Vieillot makes the *Sylvicolæ* the second order in his arrangement. The second tribe of this order (*Anisodactyli*) is made up of numerous families. The twenty-fourth consists of the Bee-eaters and Kingfishers. It is immediately preceded by the *Epopsides*, and immediately succeeded by the *Antriades* (*Rupicola*), the twenty-sixth (*Prionotes*) consisting of the Motmots and *Calao* (Hornbills).

The *Alcyons*, the seventh order of M. Temminck, consist of the Bee-eaters, the Kingfishers (*Martin-pêcheurs*), and the King-hunters (*Martin-chasseurs*).

In the method of M. de Blainville his *Scansores* are divided into the *Hétérodactyles*, the *Zygodactyles*, and the *Syndactyles*. *Alcedo* (Linn.) is the representative of the latter. In the method of the same zoologist, as developed by M. Lherminier, the Kingfishers (*Martin-pêcheurs*—*Alcedo*, Linn.) are placed in the first or normal subclass, and form the thirteenth family, coming between *Merops* and *Buceros*.

Mr. Vigors, in his paper 'On the Natural Affinities that connect the Orders and Families of Birds,' observes, that if the genus *Todus* of authors be examined with reference to its general affinities, an intimate resemblance will be found between it and the succeeding group of *Halcyonidæ*; since the only species known when he wrote exhibits the exact representation of a Kingfisher, with the exception of a shorter and more depressed bill. He is of opinion that we are thus conducted to the *Halcyon* of Mr. Swainson, a genus which he thinks extremely distinct and well-defined (regretting however—and with justice—that the name had not been retained for that group of the family which includes the European Kingfisher, the bird known to the antients under that name), and from that genus to the *Dacelo* of Dr. Leach, until, in the more slender bill of *Alcedo*, is found an approaching conformity to the more delicately-shaped bills of the succeeding family of *Meropidæ*. In the group of *Halcyonidæ* he places the *Galbula* of Brisson, which, though distinguished from the groups of which Mr. Vigors is treating by its zygodactyle feet, and as such arranged by modern writers among the true *Scansores*, was, Mr. Vigors observes in continuation, originally included in the genus *Alcedo* by that great master of natural affinities, Linnæus, on account of the identity of the general structure and economy of both groups. Here Mr. Vigors thinks that it must necessarily be placed, if we look to natural affinity rather than the strict dictates of artificial arrangement; and with it he fancies may be placed some apparently conterminous groups, *Capito* of Vieillot, and some of its affinities, &c., of which the toes are equally disposed in pairs. The relationship of all to the true *Scansores* may, he says, be accounted for by the consideration of that tendency which opposite sides of a circle of affinity generally evince to approach each other. The very difference however between the feet of *Alcedo* and *Galbula* (which two groups, at the same time, he adds, it must be remarked, agree more intimately in every particular of the leg and foot, except the scansorial disposition of the toes, than *Galbula* accords with any of the *Scansores* in the same characters) is lost in a species of *Galbula* which Mr. Vigors had lately inspected from Brasil, where one of the hind toes is wanting, and where the foot thus exactly corresponds with that of the three-toed *Halcyonidæ*, or the genus *Ceyx* of M. Lacépède. The singular and beautiful species of the Linnæan *Alcedo*, the *Ternate Kingfisher*, which Mr. Vigors characterises as a genus under the name of *Tanysiptera*, shows, in his opinion, the equal approximation of that genus to *Galbula*, and a deviation from its own type, its tail deserting the shortened character of that of the true *Kingfisher*, and assuming the lengthened and graduated conformation of the same member in the *Paradise Jacamar* and the other long-tailed *Galbulæ*. Having now arrived at the last family of the tribe, Mr. Vigors directs us to look for that connecting affinity which will lead us back to that other family of it with which he commenced his observations. Here again, he remarks, the universally-acknowledged relationship between the *Halcyonidæ* and the *Meropidæ* leaves him nothing to observe. He refers to the gradually-attenuated bills of *Alcedo* and *Galbula*, and the increasing length of the tail in the latter genus, as softening down the differences by which these families, united by general habits and economy, alone appear to be separated. Thus the circular succession of affinities by which the tribe of *Fissirostres* returns into itself appears to Mr. Vigors to be complete.

The fifth and last family of M. Latreille's second order (*Passereaux*) consists of the Bee-eaters, Motmots, Todies, Kingfishers, the genus *Ceyx*, and the Hornbills. The fourth family comprises the *Tenuirostres*, and the *Scansores* (*Grimpeurs*) form the order which immediately follows the *Passereaux*.

The Prince of Musignano (C. L. Bonaparte), in his 'Tabella analitica de' Generi' (*Specchio Comparativo*, 1827), makes the tribe *Ambulatores* immediately follow the tribe *Scansores*. The first family of the *Ambulatores* consists of the genera *Alcedo* and *Merops*.

In M. Lesson's 'Projet' the third tribe (*Syndactyles*) of the first order, *Insessores* or *Scansores* (Grimpeurs), includes four families, in the following order:—*Meropidæ*, *Halcyonidæ* (Alcyonées), *Rupicolidæ* (Rupicolées), and *Buceridæ*.

In the 'Table Méthodique,' at the end of his 'Manuel,' he makes the family *Meropidæ* comprise the genera *Merops*, *Alcedo*, *Dacelo*, *Ceyx*, *Syma*, *Todiramphus*, *Momotus*, and *Buceros*.

Mr. Eyton, in his arrangement, published in his 'History of the Rarer Species of British Birds' (1836), makes his fourth family (*Tenuirostres*, Cuv.) of his second order (*Passeres*, Linn.) consist of three divisions:—1st, the *Anisodactyli*, Temm.; 2nd, the *Syndactyli*, Cuv.; and 3rd, the *Alcyones*, Temm. The latter division contains the genus *Alcedo*, Ray, whilst *Merops* is arranged under the *Syndactyli*.

Mr. Swainson, in the 1st volume of his 'Classification of Birds' (1836), when treating of the *Syndactyle* foot, allows the term to be good, if limited to such feet, with united toes, *as are of a different formation to all others*, and would not, even if the toes were free, come under any of the definitions which he had previously given. Such a form of foot, he says, will be found in the genera *Merops* and *Alcedo*, containing the Bee-eaters and Kingfishers, to whose feet, '*par excellence*,' he limits the term *Syndactyle*. 'The habits of these two groups,' continues Mr. Swainson, 'as far as concerns the use of their feet, are nearly the same, for in neither are these members ever employed but to rest the body. The Kingfisher watches patiently from a fixed station, generally a naked twig overhanging the water, for such fish as come within its reach, and then, after a time, flies to another station, where it alights and remains. The feet, from not being used for walking or standing, are consequently very small, and the toes imperfectly developed; there are three in front and one behind, but two of the former might be almost reckoned as only one, since they are united together even to the commencement of their respective claws; the inner toe is not half the length of the others, and seems rudimentary: it has a claw, and is rather more detached at its tip than the other two; in some, as in the three-toed Kingfishers, this inner toe disappears. The hinder toe is very short, and scarcely longer than the inner one; the scales of the whole foot are so thin and transparent that they can scarcely be seen in the small species by the naked eye. Those who have seen so much of the true Kingfishers, so scarce in England, but so common in Tropical America, know that they never perch upon any other than small or slender branches; and this we may infer from the shape of the foot. The two outer anterior

toes are very long, so that they would completely clasp two-thirds of the circumference of a small branch, the other third being embraced by the hinder toe. This fact is further confirmed by the unusual flatness of the soles of all, and by the acuteness of the claws, which, from being but slightly curved, would not upon a small branch come into contact with the wood; the union of the three anterior toes, by producing considerable breadth of sole, gives an unusual degree of steadiness to the bird, highly conducive to its remaining very long in one position. Thus we see that the foot of the Kingfisher, which at first appears so very imperfect, and so totally useless for ordinary purposes, is that which is most of all suited to the habits and the wants of the bird. The Bee-eaters, like the Swallows, feed upon the wing, yet, unlike those birds, they never perch upon the ground; at least we can affirm this of the European species (*Merops Apiaster*), which visits the island of Sicily every year in great numbers, and remains for near a month, on its passage from Africa to middle and southern Europe. During this period we have sought for many years every opportunity of detecting these birds in their resting position, but never were successful in finding them otherwise than on the tops of the olive-trees, where they rest immoveable until they again dart off for another long excursion. It is indeed obvious that they could not walk, for their feet are much the same as the Wood Kingfishers (*Dacelo*), with this only difference, that the three anterior toes are divided the whole length of their last joint, the scales being rather more conspicuous.'

In the second volume of the same work Mr. Swainson speaks of the *Halcyonidæ*, or Kingfishers, as obviously connected with the *Meropidæ*, next to which he arranges them. These comprise, he observes, several well-marked genera, agreeing among themselves in the great length of their bill and in the extreme shortness of their feet. These characters, he adds, it is true, belong also to the true Bee-eater; but a remarkable difference in economy is developed in the Kingfisher. 'We have seen,' continues Mr. Swainson, 'that the Goatsuckers, Swallows, and Bee-eaters traverse the air to search after and pursue their prey; their wings are consequently adapted for long and continued flight; but the family before us have a different economy, and therefore a different organization. The whole of the genera are sedentary, *watching* for their food from a fixed station, which they only quit as soon as their prey approaches sufficiently near to come within the sweep of their wings; if unsuccessful in their first attack, they do not pursue their game, but return again to their post, and patiently wait for another luckless straggler; if their first attack is successful, they return with their victim to the same station, and then proceed to swallow it. Every one knows that these are the habits of the European Kingfisher (*Alcedo ispida*), and travellers affirm that the Kinghunters (*Halcyon*) pursue the same method in the forests of the Old World. But it has unfortunately happened that systematic naturalists totally unacquainted with the natural habits of the other genera (nearly all of which are confined to Tropical America) have fancied they were climbing-birds, and have consequently placed them in other orders whose organization and economy are widely different. Thus the Jacamars, in the *Règne Animal*, are placed after the Hornbills, and the Puff-birds (*Tamatia*) are associated with the Cuckoos.'

The following characters are assigned by Mr. Swainson to the *Halcyonidæ*:—

Wings rounded, not formed for rapid flight. *Feet* very feeble. *Toes* in pairs.

And he makes the family consist of the following genera and subgenera:—Genus Tamatia, comprising *Tamatia*, Cuv.; *Capito*, Vieill.; *Lypornix*, Wagler; *Monassa*, Vieill.; and *Brachypetes*, Sw.—Genus Halcyon, Sw., including *Dacelo*, Leach; *Halcyon*, Sw.; *Syma*, Lesson; *Todiramphus*, Lesson; and *Ceyx*, Lacépède.—Genus Alcedo, Linn., comprehending *Alcedo; Ispida*, Sw.; *Tanysiptera*, Vigors; and *Alcyone*, Sw.—Genus Lamprotila, Sw.—Genus *Galbula*, Linn. (Brisson, we suppose, is meant; Linnæus has no such genus).

Tamatia. (Puff-Birds.)

Generic Character.—*Bill* straight, compressed. *Nostrils* defended by long, stiff, incurved feathers and bristles. *Rictus* strongly bristled. Toes versatile, as in *Cuculus* (Swainson).

Under the article BARBETS, vol. iii., p. 434, the reader will find a figure of *Tamatia macrorhynchos*, and Mr. Swainson's description of the habits of the *Puff-birds* in general. In his 'Classification of Birds,' vol. ii., the same author states that the Hermit Birds (*Monassa*) have similar habits, and frequently rise up perpendicularly in the air, make a swoop, and return again to their former station.

The subgenera he characterises as follows:—

Tamatia.—*Bill* moderate, thick, conic; the tip but slightly bent. *Tail* narrow. Conirostral (*T. maculata*, 'Braz. Birds,' pl. 11.)

Capito.—*Bill* long; the tip abruptly bent, so as to form a hook. *Tail* narrow, Dentirostral. (*C. leucotis*, 'Brazil. Birds,' pl. 11; *C. somnolentus*, *Ib.*, pl. 9.)

Lypornix.—*Bill* moderate, defended by very long bristles. Both mandibles nearly equal. *Wings* very short, rounded. *Tail* narrow. Tenuirostral. (*L. striata*, 'Brazil. Birds,' pl. 34; *L. rubicula*, *Ib.*, pl. 25.)

Monassa.—*Bill* as in *Lypornix*, without the basal bristles, but with short setaceous feathers. *Wings* short. *Tail* lengthened, and very broad. Scansorial. (*M. leucops*, 'Braz. Birds,' pl. 12.)

Brachypetes.—*Bill* as in *Lypornix*, but shorter, higher, and more curved; the margins greatly inflexed. *Wings* long. *Tail* short and even. Fissirostral. (*B. tenebrosa*, 'Braz. Birds,' pl. 35.)

Geographical distribution.—All these are inhabitants of the New World.

Halcyon.

Generic Character.—*Bill* long, very straight, cylindrical; the sides widened; the base more or less depressed; gonys ascending. *Feet* syndactyle. (Swainson.)

The following subgenera are thus characterized:—

Dacelo.—Margin of the upper *mandible* considerably sinuated near the tip. *Wings* lengthened; the quills slightly mucronate. *Tarsus* covered with rough scales. Australian range. (Sw.)

Example, *Dacelo gigantea*. White's 'Voy.,' pl. 2. (Sw.

Dr. Leach thus describes *Dacelo gigantea*, the *Gigantic Dacelo*, *Alcedo gigantea* of Latham, *Alcedo fusca* of Gmelin. *Body* olive-brown, beneath whitish; tail banded with black and ferruginous, the tip white; upper mandible blackish, under one whitish with a blackish base. *Male*, with its head slightly crested, the crest fuscous; legs yellow; belly banded with blackish. *Female*, with the crown of the head brown, without a crest; legs brown. (*Zool. Misc.*, vol. 2.)



Dacelo gigantea.

Locality.—Dr. Leach gives New Holland as the habitat, where, he adds, it is a very common bird; and he says that it is known by the appellation of *Gigantic* or *Great Brown Kingfisher*. In Governor Phillip's 'Voyage to Botany Bay'

(Lond. 4to., 1789), the *Great Brown Kingfisher* is described at length, with the observation that these birds vary much, the colours being more or less brilliant, and in some of them the tail is stated to be wholly barred with white and black, and the legs brown or blackish. The species is there said to inhabit various places in the South Seas, being pretty common in New Guinea; but the specimen, from which the figure given in the work was taken, was sent from Port Jackson, where it is said to be not unfrequently met with. It is the 'Laughing Jackass' of the colonists of Sydney; and *cuck'unda* of the natives, according to Lesson, who says it is very common on the banks of Fish River, where he killed a great number.

Halcyon.—*Bill* long, straight, broad, nearly quadrangular; culmen slightly inclining towards the tip, near which the margin is slightly sinuated; gape smooth. *Wings* broad, short, rounded. *Tail* very short. *Feet* syndactyle; scales of the *tarsus* obsolete. (Sw.)

Example, *Halcyon cinnamomina.* (Sw.)

The generic character above given appears in Mr. Swainson's 'Classification of Birds.' In his 'Zoological Illustrations' (1st series), he states that the two extreme points of difference in the Linnæan Kingfishers are seen in *Alcedo ispida* and *A. gigantea*, 'the last of which has been made into the genus *Dacelo*. It will nevertheless be found that from among the birds left in the old genus there are a great number (of which indeed this bird, *Halcyon cinnamominus*, as it is there named, 'is a striking example'), which are much nearer allied to *Dacelo* than to *Alcedo*, where they now stand. It will appear therefore more natural to consider *Halcyon* and *Dacelo* as one genus, which may be called by either name, but which must be distinguished by the characters herein given to *Halcyon*, inasmuch as the generic definition of *Dacelo* (founded on one bird) will be found too restricted to comprehend all.'

Mr. Swainson then proceeds to give the following description of '*Halcyon cinnamominus*, Cinnamon Crab-eater,' from a bird in the possession of Mr. Leadbeater, by whom it was received from New Zealand, and who gave Mr. Swainson the opportunity of publishing his figure and description.

Total length ten inches; bill two and a half from the gape, and one and a half from the nostrils; the tip of the upper mandible with a slight inclination downwards, and with an appearance of a notch; the whole head, neck, and under plumage of a delicate fawn colour; under wing covers the same; the remaining upper plumage with the wings and tail changeable blue-green; ears sea-green and dusky united to a narrow black nuchal collar; wings four inches long, and the tail, which is even, three and a quarter; the hind head is slightly crested, and the feet pale-brown.' (Sw.)



Halcyon cinnamomina. (Swainson.)

N. B. The sub-genus *Halcyon*, as given in Mr. Swainson's 'Classification of Birds,' vol. ii., consists of many species, and has a wide geographical distribution in the Old World.

Syma.—*Bill* long, enlarged at the base, compressed and thin on the sides towards its extremity, upper mandible slightly curved from the base to the point (which is very sharp), and longer than the lower mandible, which is carinated below and convex, and very sharp at its point, which is lodged in the groove (rainure) of the upper mandible; edges of both mandibles furnished for two-thirds of their length with sharp serrated teeth, strong and numerous, and directed from before backwards. Lower space around the eye naked. Third and fourth quills equal, long, the first short. *Tarsi* moderate, the three anterior *toes* united, the external toe shortest. *Wings* short. *Tail* moderate with unequal feathers to the number of ten great ones, and two external small ones. (Lesson.)

Example, *Syma Torotoro*, Less.; *Alcedo ruficeps*, Cuv.

Description.—*Length* seven inches from the tip of the bill to the extremity of the tail. The *Bill* two inches from the commissure to the point, and the tail twenty-seven lines. *Colour.*—Bill entirely of a brilliant golden yellow; head and cheeks of a bright uniform cinnamon yellow separated by a brighter tint in the form of a collar from the mantle (*manteau*) by two spots of a deep black, which do not entirely unite upon the neck. Around the eye a black circle; feathers of the mantle velvet-black, those of the wing-coverts uniform blue-green, rump bright green; quills brown within and bordered with metallic greenish externally; tail-feathers equal, of a rather deep-blue above and brown below. Throat of a light but very clear yellowish, which becomes deeper on the sides of the belly and breast, to become lighter and pass into whitish on the abdomen (bas-ventre). Feet rather strong, of a bright yellow; nails black. (Lesson.)

M. Lesson, who established this genus, states that it haunts the banks of the sea, among the Mangroves—*palétuviers*—(*Bruguiera*). He says that it skims the shores (grêves) for the purpose of seizing as it flies the small fishes which its strongly dentilated bill secures. He also observed many individuals skimming in their flight the waters of the small streams which are discharged into the harbour of Doréry at New Guinea, and he says that the Papuans name the bird '*torotoro*,' doubtless from its cry.

Todiramphus.—*Bill* straight (the lower mandible very slightly swollen or convex), very much depressed, wider than it is high, without any *arête*, the mandibles equal, obtuse at the end and flattened, the edges being entirely smooth. *Nostrils* basal, the fissure oblique and hardly apparent, bordered by the frontal feathers. *Wings* short, rounded; first quill shortest, and the fourth longest. *Tail* long, the feathers equal, and twelve in number. *Tarsi* elongated, moderate, and reticulated. (Lesson.)

Geographical Distribution and Habits of Todiramphus.—M. Lesson, who established this natural group, states that they live in the islands of the South Seas. They inhabit the woods, and perch almost constantly on the cocoa-palms (*Cocotiers*). Their nourishment is only composed of small flies (*moucherons*), which they seize when the insects come to pitch on the spathes charged with the flowers of the palm. The Islanders name them *O-tataré*. They were sacred birds, and it was forbidden to kill them under severe penalties. Their skins were offered to the great god *Oro*.

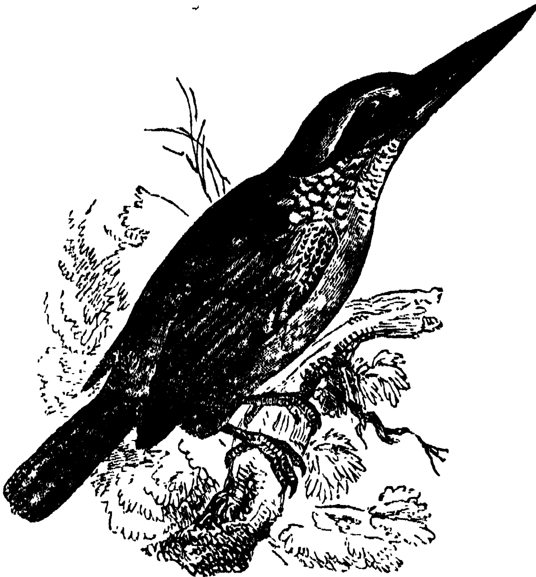
Example, *Todiramphus sacer*: *Alcedo tuta*, Gm. and Lath.; *Alcedo sacra*, Gm. and Lath.; *Sacred King's-fisher*, Lath.

Description.—Total *length*, eight inches six lines; bill, twenty-one lines from the commissure to the point; tail, three inches. *Bill* black, white at the origin of the lower mandible; summit of the head covered with brownish-green feathers, which form a sort of hood (*calotte*), separated by a large white streak which rises on the front, passes above the eyes, and continues behind the occiput. A large black line (*trait*) springs from the eye, and taking a tinge of green and then of brown, forms a border to the white line and circumscribes it. Throat, breast, and all the upper part of the body pure white; a very large, whitish, demicollar, waved (*sinuolé*) with light brown and very light chesnut, occupies the upper part of the mantle and is bordered with black; the back, coverts of the wings, rump, upper part of the tail and wings, are uniform bluish-green;

the greater quills are brown and blue on their external border; the other quills (*remiges moyennes*) terminated with brown. Tail brown below. *Tarsi* black. The *wings* extend to the upper third of the tail.

M. Lesson, whose description we have selected, says that the species is very common in the Islands of Otaheite, or Taheite, and Borabora. It perches on the cocoa-palms, and the natives call it *Otataré*. Its flight is short, and it is not timid. It lives on the insects which the honied exudations of the cocoa-flowers attract. This species and *Psittacus Tahitensis* remain constantly on the cocoa-nut trees, which form girdles on the shores of all those islands.

Dr. Latham remarks that his *Sacred King's-fisher* has been found in Dusky Bay, New Zealand, where it is called *Ghotaré*.



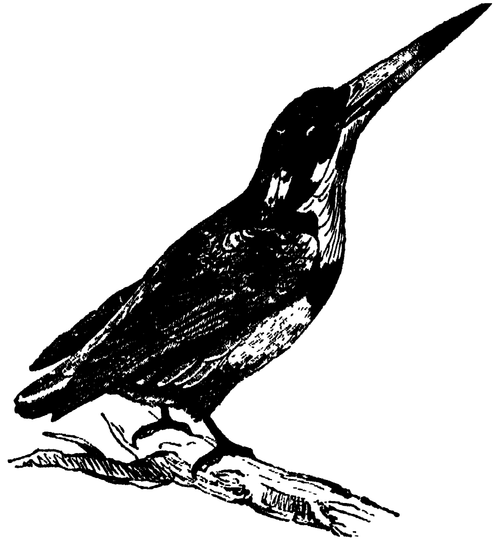
Todiramphus sacer (Sacred King's-fisher).

Ceyx.—*Bill* entirely straight, long, a little flattened vertically, the mandibles of equal height, smooth on their edges, having each a rounded *arête* on their middle and the points equal and blunt; *nostrils* basal, oblique, and small. Third *quill* the longest. *Tail* very short, the feathers slightly unequal. *Tarsi* short, delicate, with only three slender toes, of which the two anterior are strongly united, and the hind toe free. (Lesson.)

M. Lesson remarks that the genus is founded on the *Alcedo tridactyla* of Latham, of which the *Martin-pêcheur de l'Isle de Luçon* of Sonnerat is only regarded as a variety. He also notices the *Ceyx azurea*, *Alcedo azurea* of Latham, and the *Ceyx Meninting* (*Alcedo Biru* of Horsfield?). He remarks that *C. azurea* was killed on the edge of the harbour of Doréry, in New Guinea, and that Latham indicates Norfolk Island, and Lewin, Port Jackson, as its habitats. The *C. Meninting* (*Meninting-watu*, or *Burung-Biru* of the Javanese), which he considers identical with *Alcedo Bengalensis* of Edwards, inhabits, he says, the banks of the small streams round the harbour of Doréry, at New Guinea.

Dr. Horsfield describes the *Burung-Biru* as by no means uncommon in Java. He observed it chiefly in the interior, in low situations; but it was also found in the maritime districts. Its habits and manners were those of the European Kingfisher. It darts in short rapid flights along the surface among rivulets and lakes, emitting as it moves shrill sounds in a high key. These sounds are so strong and acute, that when the bird is near they strike the ear in an unpleasant manner. It is not unfrequently observed perched on trees on the banks of rivulets, and its food consists of small fishes and of aquatic insects. (*Zool. Researches in Java.*)

Sonnerat describes his second species of Kingfisher, from the Isle of Luçon, as about one-third less than the Kingfisher of Europe, and as one of the most brilliant of birds. The whole head, the neck behind, the sides of the neck, the back, the rump, and tail, are of a deep lilac; the wings indigo-blue, approaching to black, but a bright and shining border of blue surrounds each feather; the throat, the neck, the belly, and the under part of the tail are white; the bill is very long, of a carmine-red, 'dont la nuance est foible;' the feet are red; 'that,' adds Sonnerat, 'which especially characterizes it, is that it has but three toes upon each foot, two before and one behind.' (*Voyage à la Nouvelle Guinée.*)



Meninting-watu, or Burung-Biru. (Horsfield.)



Le Martin Pêcheur de l'Isle de Luçon, 2nd species (copied from Sonnerat's plate, which was apparently taken from an ill-stuffed specimen).

Mr. Swainson refers to this plate, only under the name of *Ceyx triductyla*, as an example of the genus.

Alcedo.

Generic Character.—*Bill* very straight, compressed its whole length; the tip of both mandibles acute, and the upper one not inclined, commissure perfectly straight. *Feet* syndactyle, all the tarsal scales obsolete. (Sw.)

Alcedo.—*Tail* very short. *Feet* with three toes before and one behind, claws simple. Culmen of the *bill* sharp, carinated, and simple. Inner and hinder toes of equal length. (Sw.)

Locality.—Inhabits only the Only World. (Swainson.)

Example, *Alcedo Ispida*, Linn. This is the *Martin-Pêcheur* of the French; and also *Pescheur, Martinet Pescheur, Tartarin, Artre*, and *Mounier*, according to Belon; *Piumbino, Ucello del Paradiso, Pescatore, Pescatore del Re, Martino Pescatore, Ucello di Sancta Maria*, and *Vitriolo* of the Italians, according to Belon; *Uccello della Madonna, Uccello Santa Maria, Piombino*, and *Alcione* of the same,

according to the Prince of Musignano; *Gemeine Eisvogel* (Bechstein) and *Grosser, Kleiner und Fremder Eisvogel* (Brehm) of the Germans; *Glâs y dorlan* of the antient British, and *Common Kingfisher* of the modern British.

Whether this species is one of the birds named ἀλκυών (Halcyon) or ἀλκυών (Alcyon)—for some of the learned doubt whether the word should be aspirated or not—of Aristotle and the Greeks, is by no means satisfactorily made out, though the better opinion seems to be that it is the Ἀλκυὼν ἄφωνος of the Greek zoologist. Belon and Pennant think that it is; Klein and M. De Bomare, on the contrary (and Camus seems to agree with them), consider it as doubtful which of our birds was meant by the *Halcyon* of the antients, whose seven placid days while brooding over its poetical floating nest have become proverbial.

Description.—Bill blackish-brown, reddish at the base. Behind each eye is a patch of light orange-brown, succeeded by a white one. From each corner of the under mandible proceeds a streak of verditer-blue, tinged with verdigris-green. Crown of the head deep olive-green, the feathers tipped with verdigris-green. From the nape of the neck to the tail is a strip of verditer-blue feathers, tinged in some shades with verdigris-green. Chin and throat yellowish-white. Breast, belly, and vent orange-brown, palest towards the under tail-coverts. Tail greenish-blue; the shafts of the feathers black. Legs pale tile-red. (Selby.)

The irides are hazel. The bill of the *female* is not so long as in the other sex. The colours also are deeper and more of a green shade.

Reproduction, Habits, Food—Setting aside the fable of the floating cradle in which during the Halcyon days the bird was said to rear its young, we shall find that ornithologists have differed not a little as to the actual nest of this brilliant bird. Pennant says that it makes its nest in holes in the sides of cliffs, which it scoops to the depth of three feet, and in holes in the banks of rivers, chiefly those which before belonged to the water-rat; and he states the number of the eggs to be from five to nine, of a most beautiful transparent white. The nest, he adds, is very fetid. Pennant then refers to Aristotle's description of the nest of the ἀλκυὼν ἄφωνος, or Mute Halcyon, in which the latter states that it resembled those spherical concretions that are formed by the sea-water (ἁλοσάχνη), that it was hollow within, that the entrance was very narrow, so that if it should upset, the sea would not enter; that it resisted any violence from iron, but yielded to a blow of the hand, and when thus broken was soon reduced to powder, and that it was composed of the bones of the βελόνη (Belone)—a sea-fish so named,—for the bird lives on fish. Aristotle then states the number of eggs at five or thereabouts (*Hist. Anim.*, ix. 14). Pennant, who, as we have observed, considers the Mute Halcyon of Aristotle to be our common kingfisher, observes that much of the description above quoted seems to be founded on truth. The form of the nest, he remarks, agrees almost exactly with the curious account of it by Count Zinnani 'The materials, which Aristotle says it (the nest) was composed of, are not entirely of his own invention. Whoever has seen the nest of the kingfisher will observe it strewed with the bones and scales of fish, the fragments of the food of the owner and its young; and those who deny that it is a bird which frequents the sea must not confine their ideas to our northern shores, but reflect, that birds inhabiting a sheltered place in the more rigorous latitudes may endure exposed ones in a milder climate. Aristotle made his observations in the East, and allows that the Halcyon sometimes ascended rivers, possibly to breed, for we learn from Zinnani, that in his soft climate, Italy, it breeds in May, in banks of streams that are near the sea; and having brought up the first hatch, returns to the same place to lay a second time.' Now, it will be observed that Pennant, in his own description of the nest, speaks of nothing but the hole and the fetid remains; and though Zinnani gives a very good description of the excavated hole, he speaks with caution of the collection of fish-remains therein; for though, he says, of the 'scaglie di pesci' with which the nest was covered, 'restrano vagamente intrecciate,' he adds, 'ma forse non sono cosi disposte ad arte, bensì per accidente,' showing that he thought their disposition about the nest was probably more the result of accident than design.

Montagu, in his *Ornithological Dictionary*, says that the bird generally takes possession of a rat's hole to deposit its eggs; he then proceeds as follows· 'The many curious accounts which have been given of the nest of this bird induced us to take some pains to discover the fact. The result of our researches are (is), that the hole chosen to breed in is always ascending, and generally two or three feet in the bank; at the end is scooped a hollow, at the bottom of which is a quantity of small fish-bones, nearly half an inch thick, mixed in with the earth. This is undoubtedly the castings of the parent birds, and not the young, for we have found it even before they have eggs, and have every reason to believe that both male and female go to that spot, for no other purpose than to eject this matter, for some time before the female begins to lay, and that they dry it by the heat of their bodies, as they are frequently known to continue in the hole for hours, long before they have eggs. On this disgorged matter the female lays to the number of seven eggs, which are perfectly white and transparent, of a short oval form, weighing about one dram. The hole in which they breed is by no means fouled by the castings; but before the young are able to fly it becomes extremely fetid by the fæces of the brood, which is (are) of a watery nature, and cannot be carried away by the parent birds, as is common with most of the smaller species. In defect of which, instinct has taught them to have the entrance of their habitation ascending, by which means the filthy matter runs off, and may frequently be seen on the outside. We never could observe the old birds with anything in their bills when they went to feed their young; from which it may be concluded they eject from their stomach for that purpose.'

Mr. Selby, after noticing the ejection of bones and other indigestible parts, in pellets, by the mouth of these birds, goes on to state that they breed in the banks of the streams they haunt, either digging a hole themselves, or taking possession of that of a water-rat, which they afterwards enlarge to suit their convenience. He then proceeds as follows:—'The bearing of the hole is always diagonally upwards, and it pierces two or three feet into the bank. The nest is composed of the above-mentioned pellets of fish-bones, ejected into a small cavity at the farther end of this retreat, and upon which the eggs are laid, to the number of six or seven, of a transparent pinkish white.' He then quotes the remarks of Montagu on the sloping direction of the hole, and the use of that direction in carrying away offensive matter. (*Illustrations of British Ornithology*, vol. i.)

Mr. Rennie, in his edition of Montagu's 'Dictionary,' observes, that from the high authority of Montagu, the description above given has been copied by every recent writer, with the exception of Temminck,* who says nothing on the subject, and Wilson, who says (*Am. Orn.*, iii. 60), of his belted kingfisher (*Alcedo Alcyon*), that 'its nest is neither constructed of glue nor fish-bones.' Mr. Rennie then proceeds thus:—'We are certain of the fact that this will apply equally to our own kingfisher. In the bank of a stream at Lee in Kent, we have been acquainted with one of these nests in the same hole for several successive summers, but so far from the exuviæ of fish-bones ejected, as is done by all birds of prey, being dried on purpose to form the nest, they are scattered about the floor of the hole in all directions, from its entrance to its termination, without the least order or working up with the earth, and all moist and fetid. That the eggs may by accident be laid upon portions of these fish-bones is highly probable, as the floor is so thickly strewed with them that no vacant spot might be found, but they assuredly are not by design built up into a nest. The hole is from two to four feet long, sloping upwards, narrow at the entrance, but widening in the interior, in order perhaps to give the birds room to turn, and for the same apparent reason the eggs are not placed at the extremity. I am not a little sceptical as to its sometimes selecting the old hole of a water-rat, which is the deadly enemy to its eggs and young; but it seems to indicate a dislike to the labour of digging. It frequents the same hole for a series of years, and will not abandon it, though the nest be repeatedly plundered of the eggs or young. The accumulation of cast-bones in one of these old holes has perhaps given origin to the notion of the nest being formed of them.'

Mr. Gould, in his *Birds of Europe*, states that the eggs are deposited in a hole, such as those above alluded to, by the female, without making any nest.

* But Temminck ('Manuel,' 1820) says that the bird nestles in holes in the earth, most frequently in those abandoned by the water-rats, along the abrupt banks of rivers, often under the roots of trees, in the hollows of trees, and sometimes in the holes of rocks, and that it lays from six to eight eggs, of a lustrous white.

Small fish, such as Sticklebacks and Minnows, form the food of the Kingfisher principally, but M. Temminck and Mr. Rennie say that the bird will also eat fry or spawn (frai), slugs, worms, and leeches.

It sits immoveable on some overhanging twig, watching for its prey, and when it has secured a passing fish by a sudden dash, beats it to death against a stone on the ground, and then swallows it. At other times it will hover suspended over the water and dart on its prey, but the bird usually makes its attack from a station. The editor of the last edition of Pennant states that it has been seen balancing itself over the water in which a great many of the small, round, shining beetles were swimming swiftly in circles (*gyrinus natator ?*), and which it makes its prey.

This species, when adult, appears to be mute except at the season of pairing; but the young are very clamorous, and frequently betray their retreat before they leave the nest —which they do not quit till they are fully fledged—by their cries. Before they provide for themselves, which they soon do, they sit on some branch while the parents fish for them, and on their approach with food are very noisy.

The flight of this bird is most rapid; it darts by like an iridescent gleam.

Locality.—Temminck states that *Alcedo ispida* occurs more in the south of Europe than in the north. In Holland, he says that it is not widely spread. Mr. Selby says that it is generally dispersed through Europe, and that our birds differ in no respect from those of the same species in Asia and Africa, as he has had an opportunity of examining specimens from both continents. M. Temminck observes that the most common of the three species of Kingfisher must not be confounded with our *Alcedo ispida*, though it differs but little from it. The common Kingfisher is a resident with us, as it is in Italy and other European countries. Mr. Gould says that the young in the British Islands appear to have habits of partial migration, as they wander from the interior along the rivers to the coasts, frequenting, in the autumnal and winter months, the mouths of small rivulets and dykes near the sea; but more particularly along the line of the southern coast and the shores of adjacent inlets. We may here remark, that in the 'Portraits d'Oyseaux' of Belon, the following quatrain is printed under the cut of the common Kingfisher:—

> 'Le Martinet-pescheur fait sa demeure
> En temps d'hyver, au bord de l'oceau:
> Et en esté, sur riviere ou estan:
> Et de poisson se repaist à toute heure.

It may be imagined that a bird of which so many marvellous stories have been told, under the idea of its being the Halcyon of the antients, whose so-called nest, the *Halcyoneum*, was supposed to be endowed with medical properties, did not entirely escape the attention of the superstitious moderns. Thus its dried body was said to preserve woollen cloth from the moth, and if suspended by a thread from the ceiling of a room with doors and windows closed, to turn its bill towards the quarter whence the wind blew.

Barabas, in Marlowe's 'Jew of Malta,' says—

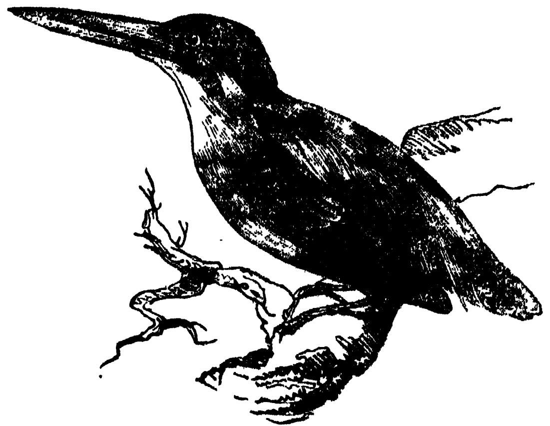
> 'But now how stands the wind?
> Into what corner peers my Halcyon's bill?
> Ha! to the east? yes.'

Kent ('King Lear'), when, in his answer to Cornwall, he is rebuking such 'slaves' as the 'Steward,' declares that they

> 'Renege, affirm, and turn their Halcyon beaks
> With every gale and vary of their masters.'

Mrs. Charlotte Smith states that she once or twice saw a stuffed bird of this species hanging from the beam of a cottage-room as a weather-vane to show the way of the wind. It has lately been seen in a similar position at Botley near Southampton. In the same part of the country some of the common people fancy that if a dead kingfisher be suspended by the bill it will turn its breast according to the ebb and flow of the tide. The bird was also supposed to be a protection against thunder, to increase hidden treasure, to bestow grace and beauty on the person who carried it, and to renew its plumage, dead as it was, every season by moulting.

With reference to the question as to what species was meant by Aristotle, the reader should be aware that another Kingfisher, *Alcedo rudis* of Linnæus (*Ispida ?* Swainson), occurs in the islands of the Grecian Archipelago, though Africa and Asia appear to be its more particular localities. The species is figured in Mr. Gould's beautiful work on the 'Birds of Europe.'



Alcedo ispida.

Ispida. Habit of *Alcedo.*—Culmen obtuse, somewhat flattened, and margined on each side by an indented groove. *Tail* lengthened, rounded. Inner toe much longer than the hinder. *Claws* either deeply notched, or cleft so as to present two acute unequal points. (Sw.)

Geographical Distribution.—Chiefly the New World. (Swainson.)

Mr. Swainson, who, in his 'Classification of Birds,' gives the habitat above stated, describes two species, *Ispida gigantea*, and *Ispida bicincta*, in his birds of Western Africa. He states, and with reason, that among the largest sized Kingfishers that have long been imperfectly known and incorporated in our systems, there is the greatest confusion, not only as to the characters of the birds themselves, but likewise in regard to their native countries. We have therefore, knowing the accuracy of Mr. Swainson's pencil, copied his figures of *Halcyon cinnamomina*, *Ispida gigantea*, and *Alcyone Australis* (the latter from Mr. Swainson's figure in the Zoological Illustrations, with the aid of a specimen in the Museum of the Zoological Society of London), as the best, if not the only mode of conveying to the reader the forms that he would designate under the names of *Halcyon*, *Ispida*, and *Alcyone*.

Description.—Above cinereous, spotted with white; chin and cheeks white, immaculate; breast with a broad rufous collar; head above black, crested behind.

Locality, Senegal.



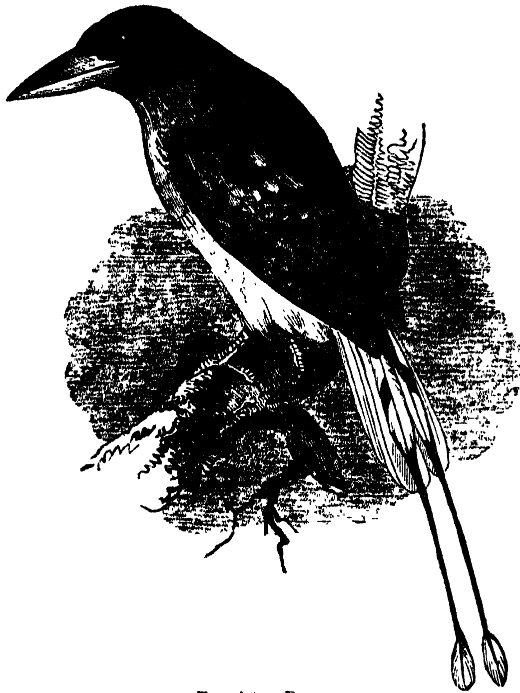
Ispida gigantea. (Swainson.)

Tanysiptera.—*Bill* rather short, somewhat thick, straight, acute; *nostrils* oval. *Tail* graduated; two middle tail-

feathers longest. (Vigors.) Mr. Swainson gives India as the *Locality*.

Example, *Tanysiptera Dea; Alcedo Dea*, Linn., *Ispida Ternatana*, Briss.

Description.—Above intense black-azure, white beneath; head and wing-coverts cærulean; tail-feathers white margined with cærulean, the two middle ones cærulean, with their apices club-shaped and white. (Vigors.)



Tanysiptera Dea.

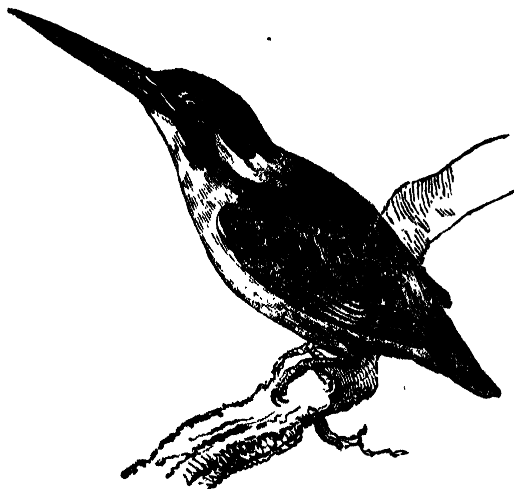
Alcyone.—*Bill* as in *Alcedo;* but the *feet* with only three toes. Australia. (Swainson.)

Example, *Alcyone Australis.*

Description.—Body above, sides of the head and neck, shining mazarine blue; beneath rufous; chin and throat whitish; wings blackish; inner fore-toe wanting. (Swainson, *Zool. Ill.*, 1st series, where it is figured and described as *Alcedo azurea.*)

Locality, New Holland.

Habits.—Lewin, who has figured this Kingfisher in his 'Birds of New Holland,' states that it inhabits heads of rivers, visiting dead trees, from the branches of which it darts on its prey in the water beneath, and is sometimes completely immersed by the velocity of its descent.



Alcyone Australis.

Lamprotila.

Generic Character.—Plumage metallic green and gold. *Bill* very broad, dilated; the commissure and culmen curved; the upper margins folding over the lower. *Nostrils* membranaceous; the aperture round, protected by feathers. *Wings* as in *Galbula*, but longer; the third and fifth quills equal. (Sw.)

Example, *Lamprotila platyrhyncha.*

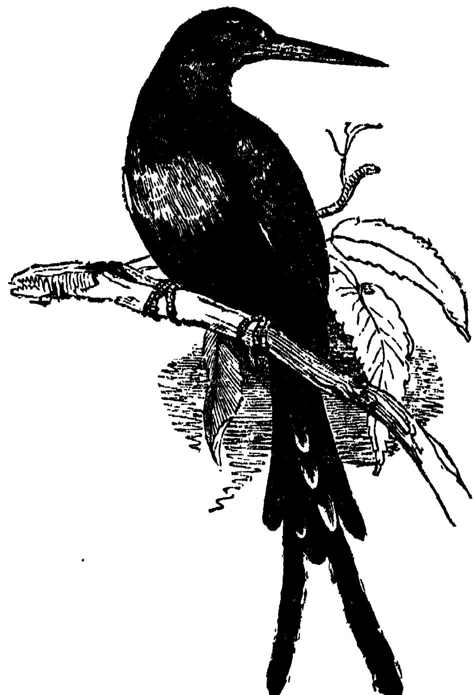


Lamprotila platyrhyncha.

Galbula.

Generic Character.—Plumage metallic. *Bill* very long, perfectly straight, greatly compressed; the culmen sharp; the tip not bent. *Wings* short. *Tail* lengthened, graduated. *Toes* in pairs, or with the *Hallux* wanting. *Nostrils* with a few strong bristles. (Sw.)

Habits.—Mr. Swainson remarks (*Classification of Birds*, vol. ii.) that the habits of the *Jacamars* and those of the *Puff-birds* and *Hermit-Birds* are similar, although the flight of the latter is weaker. 'The Jacamars,' he says, 'generally sit on low naked branches in the forest paths, from whence they dart upon butterflies, spearing them with



Galbula paradisea.

their long bill: their haunts, indeed, may frequently be known by the ground being strewed with the beautiful wings of their victims, the body of which they alone devour.'

Mr. Swainson further observes that in all the groups of this family previously noticed the bill is invariably compressed on the sides, and generally of considerable length; but in *Galbula grandis* a change from this structure is first discovered, and we see a bill considerably broad and depressed; that character, in short, which is in unison with the next family, according to Mr. Swainson's arrangement, viz. the *Trogonidæ*.

Example, *Galbula paradisea; Swallow-tailed Kingfisher*, Edw., *Paradise Jacamar*, Lath.

Description.—Size of a lark; colour golden green; throat, neck, and lesser wing-coverts white; head violaceous brown. Bill and feet, the latter of which are feathered to the toes, black; two intermediate tail-feathers longest.

Locality, Surinam.

KING'S COUNTY, an inland county of the province of Leinster, in Ireland, bounded on the north by the county of West Meath, on the east by the county of Kildare, on the south by Queen's County and the county of Tipperary, and on the west by the river Shannon, which separates it from the counties of Galway and Roscommon. From the boundary of Kildare, near Edenderry, on the east, to the Shannon at Shannon Bridge, on the west, it extends 32 Irish or 41 statute miles; and from the boundary of Tipperary, near Moneygall, on the south, to the boundary of West Meath, near Clara, on the north, 31 Irish or 39½ statute miles. According to the map published under the superintendence of the Society for the Diffusion of Useful Knowledge it contains 456,960 statute acres, or 714 square statute miles. The area has elsewhere been estimated at 528,166 statute acres, of which 394,569 are cultivated land, 133,349 are unprofitable, chiefly bog, and 248 are under water. The population in 1831 was 144,225.

The outline of the county is very irregular, extending east and west from Kildare to the Shannon, and thence stretching southward between that river and the range of the Slieve Bloom Mountains. A series of low limestone hills, running in a north-easterly direction from the northern extremity of the Slieve Bloom range, by Geashil, divides the northern portion of the county into two districts of unequal area, of which the one discharges its waters eastward to the Barrow; and the other, which is of about double the extent of the former, westward into the Shannon. This range of eminences terminates in the north-eastern part of the county, in the conical hill of Croghan, which rises 500 feet above the surrounding country, and forms the most prominent object within a circuit of twenty miles in diameter. From the northern and eastern declivities of Croghan Hill the ground slopes towards the basin of the Boyne, one branch of which, the Yellow River, has its source in the small lake of Loch Rushnel, situated in a morass at the northern foot of the hills.

From Croghan and the Yellow River to the Boyne, which forms the north-eastern boundary of the county, separating it from the barony of Carberry in Kildare, is a tract of well-cultivated country, containing the flourishing market-town of Edenderry, an antient seat of the Cooley or Cowley family, who settled here in the reign of Queen Elizabeth. A branch from the Grand Canal is carried to the town, which is situated above half a mile north from the main line. The Marquis of Downshire is the proprietor, and has contributed liberally to the construction of the canal and to the erection of a handsome and commodious market-house. South from the line of the Grand Canal, the district included between the heights of Geashil and the county of Kildare is to a great extent occupied by peat-bog, forming a portion of the great bog of Allen. This tract, extending about twelve miles every way, is divided into two principal valleys by the Philipstown and Cushina rivers, which, running from north-west to south-east, discharge themselves, through the Feagile and Little Barrow rivers, into the Great Barrow, which last forms the southern boundary of the district. The Philipstown river, which runs in a very tortuous course between undulating banks, which are generally arable for a distance of half a mile to a mile on each side of the stream, has its source on the eastern side of the bog of Ballycommon, a tract of peat-bog occupying the summit level of the central northern district of the county The highest part of the bog is 286 feet above the level of the sea, and the waters issuing from its eastern and western borders run respectively to the Barrow and the Shannon. Between the Philipstown river and the Grand Canal are included the detached bogs of Cloncrane, Esker, and Down, covering, with the bog of Ballycommon, a total area of 9499 statute acres. South of the Philipstown river, between it and the Cushina, the bogs of Mount Lucas, Clonsast, and Ballykeane, extend over 16,592 acres; and the bog of Portarlington covers a tract of 4916 acres between the Cushina and the Barrow. The highest elevation of the bogs on this side of Ballycommon is about 250 feet. The Barrow, at its junction with the Little Barrow, where it receives their waters, is 185 feet above the level of the sea, so that their drainage could be effected with unusual facility. It is estimated that the entire bogs on this side of the heights of Geashil, comprising a total of 33,656 acres, which includes some smaller tracts not specified above, could be drained at an expense of about 50,000*l.* Each of the rivers above mentioned has a margin of arable land varying from half a mile to two and three miles in breadth. The valley of the Barrow, which consists on the King's County side of such a margin interposed between it and the bog of Portarlington, is highly cultivated, and to a considerable extent occupied by the demesnes of the resident gentry. About midway between the point where it becomes the boundary of the county and its junction with the Little Barrow is Portarlington, a very well-built and respectably inhabited town, partly situated on the northern bank of the Barrow, in this county, but chiefly in Queen's County. [QUEEN'S COUNTY.] The Barrow here is shallow and comparatively rapid, having a fall of '6 feet from Portarlington to its junction with the Little Barrow. Northwest from Portarlington, near the head of the Cushina river, is the small town of Geashil, formerly a seat of the O'Dempsys. The upland tract, on which the town is situated, is said to have been one of the first places cleared of wood by the early colonists of Ireland. Agriculture is however but little advanced in the immediate vicinity of the town. Between Geashil and Croghan Hill the high ground has more of the character of a flat table-land, on the summit-level of which, nearly surrounded by the bog of Ballycommon, is Philipstown, formerly Dangin, a seat of the O'Connors, and, from 1557 to 1833, the shire town of the county. The transfer of the assizes to the neighbouring town of Tullamore in the latter year has reduced Philipstown, which was never a place of much importance, to the condition of a village. It is situated on the summit-level of the Grand Canal, the surface-water of which is 264 feet above the level of the sea.

West from the range of Geashil the country slopes to the valley of the Brosna, which, flowing from Loch Ennil in West Meath, traverses the north-western portion of the county in a direction from north of east to south of west; and, after receiving the Clodagh and Frankford rivers from the district between Geashil and the Shannon, flows into that river at Shannon Harbour. The line of the Grand Canal, which joins the Shannon at the same point, is nearly parallel to the course of the Brosna after its junction with the Clodagh. The latter river rises in Loch Annagh, a pool of marsh water on the confines of Queen's County, and receives the drainage of about 4000 acres of bog lying between Geashil and Tullamore. Tullamore, the assize town of the county, is situated on the southern bank of the Grand Canal, on a stream running into the Clodagh. [TULLAMORE.] The demesne of Lord Charleville, comprising 1500 acres, extends from the western outskirts of the town to the junction of the Tullamore and Clodagh rivers, the latter of which forms several beautiful cascades in its descent through a wooded glen in the demesne. The mansion is in the baronial style, on a scale corresponding to the extent of the grounds, and is by much the finest residence in this part of Ireland. Higher up, on the Clodagh at Clonad, is a considerable tract of wood, which, with the extensive plantations of Charleville Forest and the cultivated tract round Tullamore, forms a pleasing contrast to the boggy districts on each side. The bogs on the western side of Tullamore, lying along the southern side of the Grand Canal, occupy an area of 11,588 acres. They are disposed in three principal tracts, separated from one another by low hills of limestone gravel, and bounded on the south by the hill of Cloghan, which separates the bogs immediately bordering

on the canal from the more extensive tract lying between its southern declivity and the range of Slieve Bloom. This latter tract, consisting of five principal fields, extends over 23,986 acres, and by its drainage forms the chief supply of the Frankford or Silver river. This river has its source on the north-western declivity of Slieve Bloom, near the small town of Kinnitty, which, previous to the forfeitures of 1641, was the residence of a branch of the O'Carrol family, petty princes of Ely O'Carrol.

About five miles from Kinnitty, lower on the river, is Frankford, a thriving market-town for grain, situated in the district which was antiently possessed by the O'Molloys, the ruins of whose castle of Broghill are still standing in the neighbourhood. The Frankford river, passing under the Grand Canal at the Macartney aqueduct, runs into the Brosna, about three miles below the junction of the latter river with the Clodagh, which also passes under the canal. The valley of the Brosna is the best cultivated portion of the north western division of the county. The river winds between undulating banks, which form a margin of considerable breadth on each side free from bog, and towards West Meath spread into a well-cultivated open country about the town of Clara, which is situated on the river near the county bounds. Clara is well built, and, prior to the opening of the Grand Canal, was the chief manufacturing town of the county: the linen and cotton manufactures are now the principal branches of trade carried on in it. Below Clara, on the Brosna, are the village of Ballycumber and the town of Ferbane, the latter very pleasingly situated on the wooded banks of the river near its junction with the Shannon. The district included between the Brosna and the county of West Meath, with the exception of the arable margin of the river, is almost wholly occupied by bogs. These are of greatest extent towards the Shannon, covering an area of 17,800 acres along the banks of that river. The Blackwater stream drains this tract, and gives its name to the principal field of bog, which covers 12,105 acres. A margin of arable land borders the Shannon also, and elevated tracts of limestone gravel extend from it into the interior of this part of the county, separating the several bogs. The remainder of the bogs of this district, extending from the field drained by the Blackwater to the north of Clara, cover 11,055 acres. The most eastern of the four tracts comprised in this division is the bog of Kilmaleady, now generally known as the 'moving bog,' which in the year 1821 burst its bounds and flowed nearly a mile and a half down an adjoining valley.

The remaining portion of the county, included between the western declivities of the Slieve Bloom Mountains, Tipperary, and the Shannon, has a general slope towards the Little Brosna, which forms the boundary between King's County and Tipperary. This division of the county, with the exception of that part immediately bordering on the Shannon, lies south of the boggy region, and is little encumbered either with rough land or morass. The portion which slopes immediately to the Shannon, north of the junction of the little Brosna with that river, is bleak and moory, comprising a considerable portion of the bogs lying south of Cloghan hill. These are drained by two streams running westward to the Shannon, the more considerable of which has its source in Loch Coura, a small lake south of Cloghan. On the bank of the Shannon, between these streams, is situated the thriving town of Banagher, commanding an important pass into Connaught. The bridge which here crosses the Shannon is old and narrow, and it is proposed to erect a new one better fitted for so great a thoroughfare. There are fortifications at both ends of the bridge, commanding the approaches, and about a quarter of a mile farther down, on the King's County side, there is a circular redoubt mounting six pieces of cannon. Banagher is well situated for trade, and has several thriving manufactures. The banks of the Shannon are here richly clothed with meadow, but liable to frequent floods. The valley of the Little Brosna from the Shannon to Birr [BIRR], and thence to the range of Slieve Bloom and the borders of the county of Tipperary and Queen's County, is an undulating well inhabited district, containing extensive tracts of pasture, and towards the mountains abounding with varied and pleasing scenery. The small towns of Shinrone and Moneygale are situated in this part of the county, the latter within a few miles of Roscrea, on the northern border of Tipperary. The highest elevation of the Slieve Bloom Mountains is 1689 feet. They extend in a line from north-east to south-west, through a distance of 15 miles along the Queen's County border of this county, lying principally within the latter. A narrow pass, called the Gap of Glandine, is the only point of communication throughout this line available for purposes of general traffic. It lies near the northern extremity of the range, on the road from Frankford to Mountrath in Queen's County. A continuation of the Devil's Bit range forms the more southerly part of the boundary-line bordering on Tipperary. Through the interval between these ranges is carried the line of communication between Roscrea and Birr. These mountains, although of no great altitude, present a varied and picturesque outline, and abound with scenes of much natural beauty.

That part of the river Shannon which borders on this county is included within the division of the Middle Shannon, on which the Grand Canal Company have a jurisdiction, extending from the north end of the canal at Athlone to the north end of Loch Derg below Portumna Bridge, a total distance of 39 miles. The navigation is partly by the river and partly by lateral cuts. There are three such, with locks on that part of the Middle Shannon bordering King's County, viz. at Meelick, Banagher, and Shannon Bridge. Five steam-boats employed by the Ireland Navigation Company in connection with the City of Dublin Steam Packet Company ply on this part of the river. The largest of these steam-boats is of 282 tons burthen. The number of boats plying on the same part of the river in 1829 was 342, having a gross tonnage of 9252 tons; and in 1835 was 467, having a gross tonnage of 15,482 tons. Various improvements have been recommended by the commissioners of the Shannon Navigation, which are likely to be soon put in execution. These contemplated improvements include new bridges at Shannon Bridge and Banagher, and a foot-bridge near Meelick. [SHANNON.] The Little Brosna is navigable for small boats to a distance of about two miles from its junction with the Shannon, and it is proposed to make it navigable as far as Birr.

Climate.—Notwithstanding the great extent of wet ground on the surface of King's County, the climate is neither damp nor unwholesome. This is partly accounted for by the antiseptic quality of the peat-bog, and partly by the fact of the county lying comparatively high and open. The Queen's County side of the Slieve Bloom range is however much more favourably situated for sun and shelter than that declivity of the chain which spreads into the south-western district of this county.

Geology.—The floetz limestone of the central plain spreads over the entire area of the county, with the exception of the portions occupied by the protruded masses of the Slieve Bloom chain and the hill of Croghan. The range of Slieve Bloom consists of a nucleus of clay-slate, supporting flanks of sandstone in which the clay-slate is enveloped on all the declivities. The clay-slate is generally of a quartzy and flinty character, approaching to fine-grained grauwacke. The rock ranges 26° south of east and 15° north of west, and dips 70° towards the south. The strata are generally from one foot to three in thickness, and in some places afford excellent flags from one to five inches thick, and seven and eight feet square. The surrounding sandstone, which lies conformably on the supporting rock, is yellowish-white or grey, composed of granular particles of quartz, and very compact. It is rarely found of the red cast which characterizes the sandstone formation farther south, nor has it much of the conglomerate character. Croghan Hill consists of a protruded mass of trap conglomerate rising about 500 feet above the level of the surrounding country, with steep declivities towards the south. The limestone of the surrounding plain appears tilted up and supported on the north-western and south-western sides of the greenstone tabular masses. Calcareous matter is generally diffused through this rock, which varies from a pale lavender colour to a greyish-black, consisting, where it assumes the former appearance, of an intimate mixture of compact felspar and carbonate of lime; and where it has the latter characteristic tint, of a mixture of hornblende and felspar, containing minute disseminated particles of hornblende, calcareous-spar, quartz, and iron-pyrites. These, the calcareous fragments especially, are often found embedded in the greenstone in rounded lumps. The rock is consequently very easily decomposed, and forms an uncommonly rich and friable soil. The hill is almost all under cultivation, and yields the most abundant white and green

crops without any manure whatever. Massy strata of greenstone appear also between Croghan Hill and Philipstown, about a quarter of a mile from the latter place, whence it seems probable that the floetz limestone of the vicinity reposes immediately on the trap-rock. Granular limestone occurs at the Seven Churches in the north-west of the county, and has been quarried to the extent of 3000 cubic feet of good grey marble. Banks of rolled-limestone gravel, called eskers, occur frequently throughout the floetz limestone district. Continuous ridges of these gravel-banks surround the principal divisions of the bogs above enumerated. The eskers afford an interesting subject of study to the geologist, as from their structure they appear to have been deposited from water in violent action, and their external configuration affords an index to the direction of the current.

Soil, &c.—The bogs, which occupy so large a portion of the county, generally repose on limestone-gravel. The peat, although apparently spongy and easily permeable, is very retentive of water, as shown by the remarkable fact of surface pools existing in the bogs within short distances of each other, on different levels. The soil in general is not naturally fertile, but can be made to yield very good crops in the arable districts by manuring with the lime and bog-stuff which abound throughout the county. The soil of that side of the Slieve Bloom range included in King's County is cold and gritty, with the exception of one portion near the middle of the range, where the limestone reaches high up the declivities of Knocknaman, Castletown, and Cumber hills. This part of the range affords fertile and extensive pastures, which are grazed throughout the year with flocks of sheep and young cattle. In the district lying between these mountains and that portion of Tipperary which intervenes between them and the Shannon the soil is generally a light gravel, easily tilled, and tolerably fertile. Farther north on this side of the county it becomes stiff and moory; and throughout a great part of the barony of Garrycastle, which stretches along the entire line of the Shannon, the rock is covered only by a thin stratum of poor clayey moor. The banks of the Shannon however, where they are occasionally overflowed, afford considerable tracts of fine meadow, and the eskers and derries, as the open spots of dry ground in and between the bogs are termed, have generally a rich friable soil. The chief grazing districts in the county lie on the borders of West Meath, where the pastures are considered very favourable to wool-growing. Throughout the central division the soil, where unencumbered with bog, is almost wholly in tillage. In the south-eastern districts bordering on Queen's County and Kildare tillage is not so much attended to, the insulated tracts between the bogs being better calculated for grazing. The best ground in the county is in the north-western division, from Croghan Hill to the boundary of Meath. It is equal to fattening bullocks of any weight, and is consequently little broken up by tillage. Forest-trees flourish here, the ash especially, with peculiar vigour, and the hedge-rows of white thorn are remarkably luxuriant. The average sales of grain for each of the ten years preceding 1836 in the principal market-towns of King's County appear from the following table:-

	Barrels of Wheat, of 26 stone.	Barrels of Oats, of 16 stone.	Barrels of Barley, of 16 stone.
Tullamore	45,000	35,000	20,000
Philipstown	100	9,000	6,000
Clara	16,000	16,600	none.
Ferbane	60,000	30,000	300
Cloghan	5,800	300	none.
Banagher	25,000	40,000	1,000
Birr	5,600	15,100	13,000
Edenderry	20,000	30,000	25,000

The linen manufacture was carried on about the beginning of the present century with considerable activity in the west of the county, but has latterly declined. There is a small manufacture of friezes, stuffs, and serges for home consumption. Distilling, brewing, and the grinding of corn are carried on at Birr and in other parts of the county, but not to any great extent. In 1831 there were 699 weavers, 13 tanners, and 18 brewers in the county.

The condition of the working classes is somewhat better in the northern and central districts of King's County than in most of the neighbouring parts of Ireland. Wages vary from 6*d.* to 10*d.* per day, on an average of 100 working days each year. The cabins of the labouring peasantry are commonly of a very bad description, particularly in the boggy districts. There is however a good number of comfortable farmers, and the people generally are of industrious and decent habits. The English language is spoken universally.

King's County is divided into the baronies of Warrenstown, on the north-east; Coolestown, on the east, containing the town of Edenderry (population in 1831, 1283); Philipstown, Lower, on the north, containing the town of Philipstown (population, 1454); Philipstown, Upper, containing part of the town of Portarlington (total population, 3091); Geashil, in the centre; Kilcoursey, on the north-west, containing the town of Clara (population, 1149); Ballycowen, west of Geashil, containing the town of Tullamore (population, 6342); Ballyboy, south of Ballycowen, containing the town of Frankford (population, 373); Garrycastle, on the west, containing the towns of Banagher (population, 2636), Shannonbridge (population, 559), and Ferbane (population 501); Eglish, south of Garrycastle; Ballybrit, south of Eglish, containing the towns of Birr or Parsonstown (population, 6594) and Crinkle (population, 531); and Clonlisk, on the south-west, containing the town of Shinrone (population, 1287) and the village of Moneygale (population, 379).

Philipstown was incorporated as a borough by charter of the 12th Elizabeth, but the corporation is now extinct; Banagher also, incorporated as a borough by charter of the 4th Charles I., has no longer any traces of a governing body: and these are the only towns in the county which have at any time had corporations.

Prior to the Union, King's County was represented in the Irish parliament by two county members, and two for each of the above boroughs. The representation of the Imperial Parliament is now limited to two county members. The constituency in 1836 consisted of 1694 voters.

The assizes are held at Tullamore. General quarter-sessions are held at Tullamore, Birr, and Philipstown, in each of which is a court-house and gaol, that at Tullamore being the county-gaol and the others bridewells. On the 1st January, 1836, the police force of this county consisted of 5 chief constables, 45 constables, 225 sub-constables, and 6 horse, supported at a cost, for the year 1835, of 9548*l.* 3*s* 8*d.*, of which 4838*l.* 5*s.* 11*d.* was chargeable against the county. The total number of criminal offenders committed to the county-gaol in the year 1836 was 672 males and 94 females, of whom 254 males and 13 females could read and write at the time of their committal, 272 males and 38 females could read only, and 146 males and 43 females could neither read nor write.

The district lunatic asylum for King's County is at Maryborough in Queen's County. There is a county infirmary at Tullamore, fever hospitals at Shinrone and Birr, and dispensaries in all the chief towns and villages. There are barracks at Banagher, Birr, Shannon-harbour, Tullamore, and Philipstown.

Population Table.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort	15,536	..	..	..	..	..	..	74,500
1813	Under Act of 1812	19,705	..	..	..	..	..	..	113,226
1821	Under Act 55 Geo. III., c. 120	22,564	25,374	..	..	..	65,558	65,530	131,088
1831	Under Act 1 Will. IV., c. 19	24,256	26,072	17,162	3,984	4,926	71,287	72,938	144,225

History and Antiquities.—Although not reduced to shire-ground as one county until the time of Mary, King's County was partially included in other shires at a very early period. It appears from sundry Pipe Rolls of the reign of Edward III. that the portion which at present borders on West Meath was in those days accounted a part of the shire of Meath, and as such was charged with royal service. The manor of Geashil, now forming the central district of the county, was, in the reign of Edward II., in like manner accounted a part of Kildare, being an antient inheritance of the Fitzgeralds. Offaly also, a part of which now lies within the bounds of King's County, was included in Kildare from the first division of Leinster into counties. But the western and south-western portions of the county, including Ely O'Carrol [BIRR] and MacCoghlan's County, although stated to have formed part of Offaly, and consequently to have been included in the first limits of the county of Kildare, do not appear to have been reduced for practical purposes to the authority of English law until the year 1557, when the act was passed which erected the whole into one county under its present name. Before that period it was generally designated Western Glenmalery, to distinguish it from Eastern Glenmalery, the present Queen's County. [QUEEN'S COUNTY.] The fort of Dangin, an old seat of the O'Connors, the chief family of Offaly, was at the same time made the shire town, and called Philipstown, in compliment to the king consort. The native chieftains for a length of time struggled against the new settlement, until A.D. 1600, when the Lord Deputy Mountjoy, having joined his forces with those of Sir Oliver Lambert, succeeded, after a deplorable destruction of life and property, in finally reducing them. An account of the military operations of which this county was the theatre, during the rebellion of 1641 and the ensuing wars, is given under the heads of the chief towns. [BIRR; TULLAMORE.] The forfeitures consequent on that rebellion and on the subsequent war of the Revolution were very extensive. On the latter occasion the number of acres of profitable land confiscated was 30,459, of a total value at that time of 89,321*l.* 14*s.* The families of Coghlan, Geoghegan, Carrol, and Grace were the most considerable among those attainted.

The ruins of the seven churches of Clonmacnoise, situated on the bank of the Shannon, in the north-western part of this county, form one of the most interesting groups of ecclesiastical remains to be met with in the island. The buildings are of various dates, from, probably, the seventh century to the twelfth. St. Kieran of Clonard founded the abbey A.D. 548. It was subsequently, but at an uncertain date, raised to the rank of a cathedral church, and so continued till A.D. 1568, when the see of Clonmacnoise was united to that of Meath. Surrounding the abbey is the antient burying-ground, containing about two Irish acres, and occupied with the sites and ruins of various religious houses. The whole is enclosed with a wall, at two of the angles of which are antient round towers, said to have been erected by O'Rourk and MacCarthy respectively. The buildings within the precincts are chiefly chapels, erected over family burying-places by the various Irish kings and chieftains, who, 'although at perpetual war in their lives, were contented to lie here peaceably in death.' They are:—Temple-Righ, built by O'Melaughlin, king of Meath; Temple-Connor, built by O'Connor Dunn; Temple-MacDermot, founded by MacDermot, prince of Coolavin; and two others, founded by O'Kelly and MacCarthy More. The place was for many centuries the Iona of Ireland, and still continues to exhibit more numerous remains of antient monuments than any other cemetery in the country. Two monumental crosses, richly carved, stand near the western door of the Temple-MacDermot. One of these, fifteen feet in height, is formed of a single stone. There are the remains of several other religious houses in the immediate vicinity. The entire group occupies a gently swelling bank, rising from the Shannon about midway between Shannon Harbour and Athlone. The place is shut in on the north and east by a vast tract of bog, and has a peculiarly lovely and picturesque appearance. Twenty-eight other religious houses are enumerated in this county, of which the chief were:—Birr; Durrow, founded A.D. 550; Gallen on the Brosna, founded in the fifth century; Monastereoras, near Edenderry, founded by John Bermingham, earl of Louth, in the year 1325; and Seirkeiran, near Birr, founded A.D 402, by St. Kiaran the Elder, and for some time a cathedral church. There are numerous remains of feudal castles, chiefly of the Elizabethan æra. Leap Castle, situated on a declivity of Slieve Bloom, in a strong and commanding position, is still inhabited; so also are Cloghan Castle and the castle of Birr. There are no very remarkable monuments of the earlier æra.

The county expenses are defrayed by grand-jury presentments. The sum levied in the year 1835 was 21,060*l.* 19*s.* 8*d.*, of which 4739*l.* 14*s.* 4*d.* was for public works, roads, &c.; 11,179*l.* 16*s.* 6*d.* was for public buildings, charities, &c.; and 5141*l.* 8*s.* 10*d.* for police and the administration of justice.

King's County embraces a portion of each of the four archiepiscopal provinces, extending into the dioceses of Clonfert, Ossory, Killaloe, Meath, and Kildare, under which the educational statistics of the county are included.

(*Statistical Survey of King's County*, Dublin, 1801; *Transactions of the Geological Society*, vol. v.; Brewer's *Beauties of Ireland; Parliamentary Reports and Papers.*)

KING'S EVIL. [SCROFULA.]

KING'S LYNN. [LYNN.]

KING'S YELLOW, the name given to orpiment, or the yellow sulphuret of arsenic, when used as a pigment. [ARSENIC.]

KINGS, THE BOOKS OF, the name of two books of the Old Testament. They originally formed only one book in the Hebrew text, and are entitled מלכים, that is, 'kings.' In the Septuagint they are divided into two books, and are entitled 'the third and fourth books of reigns' or kingdoms (βασιλειῶν τρίτη καὶ τετάρτη); since the first and second books of Samuel are called in this translation the first and second books of Kings.

These books contain an account of Jewish history from the death of David to that of Solomon (1 *Kings*, i.-xi.); an account of the division of the kingdom under his successor Rehoboam, and the history of the two kingdoms of Israel and Judah, to the conquest of the former by the Assyrians under Shalmaneser (1 *Kings*, xii.—2 *Kings*, xvii.): and the separate history of the tribes of Judah and Benjamin, till they were carried away captive to Babylon by Nebuchadnezzar in the reign of Jehoiachin. (2 *Kings*, xviii.-xxv.)

These books, in common with the books of *Chronicles* and many others of the Old Testament, are generally ascribed to Ezra; but neither the author nor the time in which they were written can be determined with any degree of certainty. It is evident from many passages, and especially from the last chapter of these books, that a portion of them must have been written in the time of the Babylonian captivity; but there are also other passages which must have been written before the destruction of the kingdom of Israel, and while the temple at Jerusalem was still standing. (1 *Kings*, viii. 8; ix. 13, 21; x. 12; xii. 19; 2 *Kings*, viii. 22; x. 27; xiv. 7; xvii. 23, 34, 41.) It is therefore probable that these books are only a collection of different documents written by persons present at the events narrated, and that the compiler only wrote such portions as were necessary to connect the different documents, and to form one continuous narrative.

There are many great discrepancies between these books and the books of *Chronicles*, which are mentioned and discussed in the article CHRONICLES.

(The *Introductions* of Eichhorn, Jahn, De Wette, Bertholdt, Augusti, and Horne; Rosenmüller's *Scholia*.)

KINGSCLERE, a village in Hampshire, remarkable for the exhibition of the green sand formation in the midst of the elevated chalk downs, on the line of an anticlinal axis passing east and west. The anticlinal axis passes through the middle of a valley (hence called a 'valley of elevation') in which the green sand appears; and it might seem on a first view that the discontinuity of the chalk was simply owing to elevation and fracture, but by considering the areas and slopes of the strata, in plans and sections on a true scale, it will immediately appear that a considerable mass of chalk must have been removed by denudation. For the knowledge of this interesting 'valley of elevation' we are indebted to Dr. Buckland. (*Geol. Trans.*, 2nd series, vol. ii.) Mr. Lyell has contemplated it in connexion with the more extensive denudation of the Weald of Kent and Sussex. (*Principles of Geol.*, book iv., ch. xxii.)

KINGSTON. [JAMAICA.]

KINGSTON-ON-HULL. [HULL.]

KINGSTON-ON-THAMES. [Surrey.]

KINIC ACID, a peculiar vegetable acid, sometimes called cinchonic acid, which was discovered in 1790 by Hoffman in cinchona bark, in which it exists in combination with the vegetable alkalis cinchonia and quina, and also with lime, forming the kinates of these bases. When an infusion of bark is evaporated till an extract is left, and that is treated with alcohol, a viscid substance remains, containing kinate of lime mixed with mucilaginous matters; if this be dissolved in water, and the solution be suffered to evaporate gradually, crystals of kinate of lime are formed in rhombic prisms; when this salt is dissolved in water, and treated with oxalic acid, oxalate of lime is precipitated, and the kinic acid remains in solution; by evaporation in a warm atmosphere this acid is deposited in crystals.

Kinic acid has a very sour, but when pure not a bitter taste; it reddens litmus paper strongly; is unalterable in the air, dissolves in 2½ times its weight of water at 48°, and is also soluble in alcohol. When heated in a retort it readily fuses, boils up, decomposes, blackens, and yields an empyreumatic oil, with pungent vapours of pyrokinic acid, one portion of which condenses into a liquid, and another crystallizes. Sulphuric acid renders kinic acid first green, and then carbonizes it; by the addition of a small portion of nitric acid it is converted into an acid resembling the pyrokinic acid, which may be sublimed; but a large quantity of nitric acid changes it into oxalic acid.

According to the analysis of Liebig anhydrous kinic acid consists of—

Nine equivalents of hydrogen		9	or	5·26
Fifteen „	carbon	90		52·63
Nine „	oxygen	72		42·11
	Equivalent	171		100·

The crystals contain one equivalent of water.

The natural kinates, except that of lime already described, are only obtained by complicated processes from the bark; but by artificial means they are readily procured, either by saturating the acid with the bases, or by the double decomposition of kinate of barytes and the sulphates of such bases as form soluble sulphates. We shall describe only a few kinates, and chiefly those which exist in the cinchona, and first we shall notice the most important of them, the

Kinate of Quina.—The natural salt crystallizes with difficulty, on account of the admixture of yellow colouring and other matters, and these have prevented the determination of its crystalline form. This salt is very bitter, readily soluble in water, and but slightly in alcohol of sp. gr. 0·837. It is decomposable by heat, without residue. By evaporation the solution is reduced to a viscid paste, which when moistened and exposed to the air exhibits rudiments of crystallization. It is, like other salts of quina, decomposed by the alkalis ammonia, potash, and soda, which precipitate the quina. Kinate of quina may be formed artificially by dissolving quina recently precipitated from the sulphate in a solution of kinic acid, with a gentle heat. By exposure to the air the liquid becomes a mammellated mass, containing small brilliant rhombic crystals of kinate of quina

This salt is a dikinate, composed of—

One equivalent of kinic acid	.	171
Two equivalents of quina	.	324
Equivalent		495

Kinate of Cinchona.—The natural compound very much resembles that of quina; the artificial salt yields crystals by exposure to the air, which are like, but are more distinct than those of the kinate of quina obtained in the same way. This salt is bitter, and very soluble in water, slightly in alcohol of sp. gr. 0·837.

This is a dikinate also, consisting of—

One equivalent of kinic acid	.	171
Two equivalents of cinchona	.	304
Equivalent		475

Kinate of Lime.—This salt crystallizes in rhomboids and hexagonal plates; it has but little taste; it is soluble in six times its weight of water at 60°, and much more so in boiling water. It is insoluble in alcohol. It is decomposed by oxalic acid and sulphuric acid, and also by the alkaline carbonates. According to Berzelius, a small quantity of kinate of lime may be obtained from the alburnum of the fir-tree.

This salt is composed of—

One equivalent of kinic acid	.	171
One equivalent of lime	.	28
Ten equivalents of water	.	90
Equivalent		289

The properties of the artificial kinates are thus, with slight alterations, given by Berzelius. *Kinate of potash*, bitter and deliquescent. *Kinate of soda* crystallizes in hexahedral prisms; it appears to contain no water of crystallization, and does not alter by exposure to the air. *Kinate of ammonia*, deliquescent. By evaporation a portion of its acid is set free. *Kinate of barytes* crystallizes in dodecahedrons with triangular faces; becomes opaque by exposure to the air; is very soluble in water, but slightly in alcohol of 0·830. *Kinate of magnesia*, very soluble, and forms crystalline excrescences similar to cauliflowers. *Kinate of manganese* crystallizes in rose-coloured lamellar crystals. *Kinate of zinc* crystallizes in laminæ, or in cauliflower-like aggregations. *Kinate of nickel*, a green gummy mass, very soluble in water. *Perkinate of iron*, a reddish-yellow gummy mass, soluble in water. *Kinate of lead* crystallizes in slender needles, which do not alter by exposure to the air, and are soluble in alcohol. *Subkinate of lead*, a white powder insoluble in water. *Kinate of copper* crystallizes in green needles, or rhombic laminæ; the surface becomes white by exposure to the air. *Perkinate of mercury*, a colourless salt which does not crystallize. *Kinate of silver* forms mammellated crystals, which readily blacken in the light.

KINKAJOU. [Potto.]

KINO, an astringent substance, the concrete juice of one or more plants. Nothing certain is known respecting the plants which produce the best kino, and several very inferior sorts exist in commerce, the origin of which is likewise far from being ascertained. It is generally stated that the best African kino is obtained from a tree, native of Gambia, called Pterocarpus erinaceus (Linn.), P. Senegalensis (Hooker). But it is confidently affirmed by Mr. Pereira that the substance commonly regarded as African kino is the juice of the Nauclea (Uncaria) Gambeer, a kind of catechu, with which it agrees in every respect. The East Indian kino is alleged to be obtained from the Butea frondosa (Roxb.), and differs considerably from the so-called African kind. In New Holland a sort of kino is procured from the Eucalyptus resinifera (White), which finds its way to the East Indies, where it is used as a cotton-dye, as indeed the other kinds are also, giving to cotton the yellowish-brown colour known as nankeen; the colour varies with the different sort of kino used.

In the West Indies the juice of the Coccoloba uvifera is called American kino, or American extract of rhatany, or false rhatany extract. These different extracts differ in their chemical habitudes with re-agents, but they all agree in possessing a strong astringent power. Kino most commonly occurs in grains of a shining aspect and rich ruby-red colour; they are easily reduced to powder. It is nearly entirely soluble in water and in alcohol. Vauquelin analyzed that sort which is termed African, and found it to consist of 75 per cent. of tannin, 24 of red mucilage, and 1 of woody fibre.

In a paper lately read before the Royal Asiatic Society, Dr. Royle has adduced satisfactory evidence to prove that some of the *Kino* of commerce is no doubt produced by *Butea frondosa*, which is common as a tree or shrub in every part of India. On comparing together specimens of the astringent gum of this plant, contained in his collection, with some brought from North-western India by Mr. Beckett, and both these with some sent from Bombay as the *Kino* of the Butea frondosa, they were all three found to be identically the same kind of gum; but Mr. Beckett's, from being the freshest specimen, was the most highly coloured. These were all moreover found to correspond, especially the specimens from Bombay, with some astringent gum found by Mr. Pereira in one of the old druggists' shops of this city, under the name of *Gummi*

rubrum astringens, which was the name by which Kino was known. It was introduced into practice by Dr. Fothergill as *Gummi astringens Gambiense*, and has been always considered to be a product of the west coast of Africa, and the tree yielding it to be *Pterocarpus erinaceus*. It is remarkable that the Sanscrit name of *Butea frondosa* is *kinsuka*. From its gum being labelled by a druggist as Gummi rubrum astringens, it is evident it must have been among the earliest substitutes for the African kind, of which so little has ever been imported into this country. Analyzed by Mr. E. Solly, junr., the Butea kino was found to contain between 60 and 70 per cent. of tannin with gum. It is curious that Dr. Roxburgh remarks of the gum of the *Butea frondosa*, that it is so like that of his *Pterocarpus marsupium* that one description might suffice for both, with respect as well to appearance as to the action of chemical re-agents.

KINOSTERNON. [TORTOISES.]

KINROSS, the capital of the county, is situated on the western bank of Loch Leven, in 56° 15′ N. lat. and 3° 10′ W. long., and is distant 19 miles north-north-west from Edinburgh.

The lower part of the town has a mean appearance, but as it rises to the north it has a cheerful look, and many handsome houses are built there, together with two excellent inns, equally remarkable for good accommodation and good keeping.

The church, which is new, and kept in good repair, is in the presbytery of Dunfermline and synod of Fife. There are four annual fairs, which are much frequented for the sale and purchase of horses and cattle. The chief manufacture of the town now consists in the weaving of coarse linen and cotton, although it was once famed for the manufacture of cutlery. The school is said to be well conducted. The master receives an annual salary of 300 marks, with the use of a house and adjoining land. The population of the town and parish of Kinross in 1831 was 2917.

KINROSS-SHIRE, a small inland county of Scotland, bounded on the east and south by Fifeshire, and on the west and north by the county of Perth, lying between 56° 8′ and 56° 17′ N. lat., and between 3° 15′ and 3° 35′ W. long. Its greatest length from Fossaway Church on the west to Auchmore Bridge on the east is 11 miles, and its greatest width from Damhead on the north to Kelty Bridge on the south, is 10 miles. The area of the county is 79 square miles, or 50,560 acres, of which 4149 are lakes. Its western boundary is in the Cleish and Ochil hills; the northern boundary is in the Ochil and Lomond hills; and the eastern boundary runs partly along the summit of the hill of Bennarty and partly along the flat ground to a point on Kelty Burn, a little below Blair-Adam bridge, which stream, deriving its source in the Cleish hills, forms the southern boundary.

The boundaries of the county are chiefly hilly, but there is a level opening from the south at Kelty Bridge, and at Blair-Adam bridge an opening to the south-east, through which the great north road passes. There is a similar level opening to the west towards Stirling, at the Crook of Devon; and a third level to the north-east between the Ochil and Lomond hills, leading towards Cupar in Fife. There is, in addition to these valleys, a narrow passage on the east, through which the river Leven flows from Loch Leven.

The borders of the county are hilly, but the interior, comprising about one-half of the whole, may be regarded as a plain slightly varied by gentle undulations. The soil is various, chiefly inclining to gravel. To the north and west of Loch Leven it is clayey, sandy, and tolerably fertile, and, according to Sinclair, produces rich and early crops, but in the more elevated parts it consists of moor and moss, though even here it forms excellent pastures. The climate, though cold and wet, owing to the general elevation of the land, has been wonderfully improved by an extensive system of drainage. Upon the whole the air is considered healthy, and the people are vigorous, and subject to few distempers. The frost sets in sooner and continues longer than in the adjacent country to the south, but notwithstanding these disadvantages agriculture has of late years been greatly improved, so that the seed-time and harvest are seldom behind those of the neighbouring districts. Enclosures of hedges and stone walls are greatly upon the increase, and it is said that the enclosed lands may usually be let from year to year for pasture at a rent equal to that for tillage upon a lease of nineteen years. The average rent of land in 1810 was 9*s.* 10*d.* per acre, and has no doubt increased considerably since that time, as the farms are mostly occupied by resident owners who are feuars of the estate of Kinross. Oats are the principal grain cultivated. The district is peculiarly well suited for turnip husbandry and rearing sheep stock, which has been lately much attended to. The plantations upon the estate of Blair-Adam are particularly deserving of mention. They were begun in 1733, and at the present time cover upwards of 1300 acres, consisting of the oak, ash, larch, elm, and beech. The Scotch fir does not grow well in exposed situations, but the spruce and silver fir grow vigorously throughout the estate.

There is some coal on the south, where the county joins the borders of Fifeshire. There are freestone quarries of good quality in that quarter, and to the north of Kinross red freestone is the geological formation of the district. The higher hills are whinstone or basalt.

This county contains several fresh-water lakes, some of which are well stocked with pike, and the rest with perch, eel, and other fish. Of these lakes the principal is Loch Leven, which, although inferior in magnitude and picturesque beauty to Loch Lomond, is still a noble piece of water, covering a surface of near 3300 acres. Its height above the level of the sea is about 300 feet. Its greatest depth is from 80 to 90 feet. It contains four islands, the largest of which is called the Inch. The lake abounds in fish, particularly trouts, pikes, perches, and eels. The trouts of Loch Leven are considered a great delicacy, and are regularly sent to the Edinburgh market. The quantity of water poured into the lake by the different feeders, and drawn out by evaporation, is subject to great variation; and the surface of the lake is in consequence elevated and depressed to the extent of two feet and a half. The level of this lake has been lately reduced by a canal made for that purpose, but the undertaking is said to have hitherto proved unprofitable.

Upon a small island at the north-west end of Loch Leven are the ruins of the castle of Loch Leven, a fortress of great antiquity, which was once the property of the Douglasses of Loch Leven, and is noted as the prison wherein Queen Mary was confined, and from which she made her escape in 1568. The antient monastery of Portmoak, on the north side of the Leven, near the lake, is said to have been built by a Pictish king, and to have been the first place in Scotland given to the Culdees after the conversion of the Picts to Christianity. On the Inch in Loch Leven, antiently called St. Serf's Isle, are the remains of an old priory built by Achains, king of the Scots, 'in honorem et ad gloriam Dei omnipotens et Sancti Servani.'

The chief streams are the Garny, and South and North Queich. The first rises among the Cleish Hills; the two latter have their source among the Ochil Mountains, and all three fall into Loch Leven. The waters which flow from Loch Leven form the river Leven, which, after a course of about 14 miles, passing through a part of Fifeshire, falls into the Frith of Forth at Largo Bay. This river gives motion to about fifty mills.

The county is well provided with roads, which are kept in good repair, and is intersected from south to north by the great north road, for which the country is indebted to the exertions of the venerable Chief Commissioner Adam, of the Jury Court. There is one large distillery, and cotton is woven at Kinross and Milnathort, chiefly for the Glasgow market.

The population of the county in 1831 was 9072. A considerable increase had taken place in the population of several of the parishes during the preceding ten years, which was attributed to the number of labourers who had been employed during that period in ditching and bringing the waste lands into cultivation. The annual value of real property in 1815 was 25,805*l.* Kinross-shire unites with the county of Clackmannan and certain parishes in the southern part of Perthshire in returning one member to parliament.

(Rev. David Ure's *View of the Agriculture of Kinross-shire*; MacCulloch's *Statistical Account of the British Empire*; *Beauties of Scotland*; *Population Returns*, &c.)

KINSALE, a sea-port town and borough in the barony of Kinsale and county of Cork, on the south coast of Ireland, situated on the river Bandon, about four miles from the sea, and about 178 English miles from Dublin. The borough and liberties constitute a barony. The river forms a safe and

commodious harbour for vessels of considerable burthen, which can come close up to the town, in which respect it has an advantage over the city of Cork, from which it is distant about 12 miles. Owing to the windings of the river, the harbour is completely land-locked, and the town is defended by Fort Charles, which stands opposite to it, and about a mile lower down the river. The town is composed of one principal street by the river side, and several narrow lanes ascending a steep hill in the rear, besides some blocks of buildings at the head of the harbour. At the census of 1831 there were 967 houses, inhabited by 1512 families, comprising 7312 individuals, of whom 3148 were males and 4164 were females. The population of the whole barony was 13,997. Of the males 20 years old and upwards, 1562 in number, 22 were engaged in agricultural pursuits, 547 were employed in retail trade or handicraft, 153 were capitalists, bankers, professional and other educated men; 680 were labourers employed in labour not agricultural; and 72 were male servants: the occupations of the remaining 88 are not given. There were besides 37 male servants under 20 years of age, and 413 female servants.

Kinsale (in Irish *cean-tail*, or 'the head of the sea') early became a place of importance to the English settlers. John de Courcy, inheriting the surrounding tract of country by intermarriage with the family of Cogan, built a castle on the promontory called the Old Head of Kinsale, at the mouth of the Bandon river, in the twelfth century. This probably led to the commencement of a town farther up the river, where a land-locked and capacious creek offered the advantages of a secure roadstead for ships of any burthen. A charter of incorporation was granted to the inhabitants A.D. 1333, and various grants of customs, &c. are subsequently on record. The place has been the scene of numerous engagements, both by sea and land. Here De Courcy defeated MacCarthy More with great slaughter of the Irish. In 1380 a battle was fought in the harbour between the English fleet and the combined fleets of France and Spain, in which the latter were signally defeated. On the 23rd September, 1601, a body of Spaniards, under the command of Don Juan D'Aquila, landed here, and seized the town for the Roman Catholic party, who were then in arms under the Earl of Tyrone and other Irish chieftains. On the 17th October the English, under the Lord Deputy Montjoy and Sir George Carew, the president of Munster, arrived before the town, and invested it on both sides of the Bandon. The siege lasted till the 28th December, when the Spaniards surrendered in consequence of the defeat of the united armies of O'Neill and O'Donnell before the town on the preceding 23rd. This defeat, attended with the loss of 1200 men killed and 800 wounded, completely broke the spirit of the insurgents, and led the way to the immediate pacification of Munster. During the wars of 1641 the town was a place of refuge for the English Protestants of the neighbouring country. It fell into the hands of the Jacobite party in the succeeding war of the Revolution, and was held by a combined French and Irish garrison for James II. from March, 1689, to the latter end of the following year, when it was taken possession of by the Protestant army under Brigadier-General Churchill, afterwards duke of Marlborough.

The governing charters bear date 7th January, 7th Edward III. and 10th May, 31st Elizabeth. The corporation is governed by a council, consisting of sovereign, burgesses, and common speaker, which last represents the freemen. The freedom is obtained by grant of the council. The criminal jurisdiction extends to all offences, treason excepted: the civil jurisdiction of the recorder's court of pleas is unlimited in all personal actions. The annual revenue averages 550*l*., and the average expenditure is 360*l*.

During the late continental war there was a government dockyard at Kinsale, in which ships of war were repaired, and the harbour was much resorted to by the king's ships as a place of refuge. This occasioned a considerable expenditure of money, which having ceased at the peace, the town is now in a declining and impoverished condition. Of all the houses which it contained in 1831, there were only 301 which were rated as being worth 10*l*. per annum and upwards, and only 402 having more than six windows each. It is observed that many of the houses have balconies in the Spanish style. The town is pretty well paved, and has a good supply of water. A large portion of the population obtain a livelihood by fishing, in which they are very expert. The boats employed in the fishery are called *hookers*; they are well-built vessels of 20 tons burthen, and go to sea in all weathers. The men are often serviceable as pilots to strange vessels that are driven on the coast. The greater part of the fish which they take is sold in the markets of Cork. In a return of the tonnage and estimated value of the exports and imports of the several ports of Ireland in the year 1835, as given in the Appendix to the Second Report of the Commissioners appointed to consider and recommend a general system of Railways for Ireland, the trade of Kinsale, including its coasting trade, is stated to be as follows:—

Imports.

			Value.
Coals, culm, and cinders	13,500	Tons,	£12,150
Iron	161	„	1,771
Corn, meal, and flour	6,613	Cwts.	2,829
Salt	11,800	Bushels,	222
Other articles			1,290
Total Value of Imports			£18,262

Exports.

			Value.
Corn, meal, and flour	18,012	Cwts.	£9,897
Potatoes	4,240	„	362
Feathers	10	„	60
Cows and oxen	10	Number,	70
Horses	6	„	80
Sheep	840	„	1,010
Swine	1,071	„	2,000
Total Value of Exports			£13,479

The fish, which, as already mentioned, are taken by the Kinsale fishermen to Cork, are not included in this statement, being taken direct to the market of consumption without being landed at Kinsale.

The borough of Kinsale returns one member to parliament. The number of persons qualified to vote in 1835 was 221, and the number who voted was 155. At the registration of 1836 the number of qualified electors was increased to 270, and the actual voters at the last general election in 1837 were 199.

(Wakefield's *Statistical and Political Account of Ireland*; Smith's *History of the County of Cork*; *Report of Railway Commissioners*; *Reports of Commissioners for the Extension of Public Works in Ireland*.)

KINTYRE, or CANTIRE. [ARGYLESHIRE.]

KINYXIS. [TORTOISES.]

KIOOSIOO. [JAPAN.]

KIPPIS, ANDREW, D.D., F.R.S., born 1725, died 1795, a nonconformist divine, held in great estimation both among the members of his own communion and generally in the world of literature and science.

He was descended of ministers who had left the church in 1662, on the passing of the Act of Uniformity, and was educated in one of those academies which the dissenters established for the education of their ministers in university learning. This academy was at Northampton; and in the time of Dr. Kippis there was at the head of it a very pious and learned tutor, Dr. Doddridge. After a few years spent in the exercise of his ministry at Boston in Lincolnshire, and at Dorking in Surrey, he settled in London, in 1753, as pastor of a congregation of Presbyterian dissenters in Westminster, of which Dr. Edmund Calamy, a name of note among the dissenters, had formerly been the minister.

Dr. Kippis continued connected with this society till his death.

The duties arising out of this connection did not preclude him from seeking other means of public usefulness. In 1763 he became a tutor in an academy for the education of dissenting ministers in London, on a plan similar to that on which the academy at Northampton had been conducted. In 1771 he was elected a Fellow of the Society of Antiquaries, and in the next year a Fellow of the Royal Society.

Dr. Kippis was a principal contributor to the 'Monthly Review' at a time when it was considered as the leading periodical work of the day. He had also much to do with

the conduct of 'The New Annual Register.' There are several pamphlets of his on the claims of the dissenters and on other topics of temporary interest. But the work with which his name is most honourably connected is the republication of the 'Biographia Britannica,' with a large addition of new lives, and a more extended account of many persons whose lives are in the former edition of that work. The design was too vast to be accomplished by any one person, however well assisted. Five large folio volumes were printed of the work, and yet it had proceeded no farther than to the name of Fastolf. Part of a sixth volume, it is understood, was printed, but it has not been given to the world.

Many of the new lives were written by Dr. Kippis himself, and particularly that of Captain Cook, which was printed in a separate form also.

Dr. Kippis's was a literary life of great industry. He was the editor of the collected edition of the works of Dr. Nathaniel Lardner, a minister of the denomination of dissenters to which he himself belonged, to which he prefixed a Life of that eminent theological scholar. He published also the ethical and theological lectures of his tutor Dr. Doddridge, with a large collection of references to authors on the various topics to which they relate, in two octavo volumes. A volume of his sermons was also published.

Dr. Kippis, like his friend Dr. Lardner, belonged to the Unitarian school of divines. He was through life distinguished by the amenity of his disposition, his active and business-like habits, his benevolence, and his piety.

KIRCHER, ATHANASIUS, born at Goysen, near Fulda, in 1602, entered at an early age the order of Jesuits, made great progress in various branches of learning, especially in the study of Hebrew and other Eastern languages, and was made professor of philosophy and Oriental languages in the college of Würzburg. He afterwards went to Avignon, where he became acquainted with the learned Peiresc, and he there applied himself to the study of antiquities. From Avignon he went to Rome, visited Naples, Sicily, and Malta, and on his return was made professor of mathematics in the Roman or Gregorian college at Rome. He filled this chair for eight years, and resigned it in order to devote himself entirely to his favourite studies. He collected a valuable museum of antiquities, which he left to the Roman college, and which has been repeatedly illustrated. (Sepi, *Romani Collegii Soc. Jesu Musæum Athanasii Kircheri novis et raris inventis locupletatum*, fol., Amsterdam, 1678, with a complete list of all the works of Kircher, published and republished; Bonanni, *Musæum Kircherianum*, fol., Rome, 1709; republished by Battara, Rome, 1773; Contucci, *Musæi Kircheriani Ærea notis illustrata*, 2 vols. fol., Rome, 1763-65.) Kircher was liberally assisted by several princes and noblemen, German, Italian, and Spanish. He died at Rome, in November, 1680. He was a man of very extensive and varied erudition, and a very copious writer; but his judgment was defective; he wanted criticism, and jumped too hastily at conclusions, fancying that he could resolve any question. He was also very credulous, as his works amply testify. He wrote on mathematical and physical sciences; on philology and hieroglyphics, and also upon history and antiquities. His principal works are: 1. 'Magnes, seu de Arte Magnetica,' libri iii.; 2. 'Primitiæ Gnomonicæ Catoptricæ, hoc est, Horologiographiæ novæ specularis;' 3. 'Ars magna Lucis et Umbræ;' 4. Prodromus Coptus;' 5. 'Institutiones Grammaticales et Lexicon Copticum.' In these two last works he gave the best information up to that time concerning the Coptic language. 6. 'Œdipus Ægyptiacus, hoc est, Universalis Hieroglyphicæ Veterum Doctrinæ Temporum Injuria abolitæ Instauratio,' 4 vols. fol., Rome, 1652-4. Kircher dedicated this work to the Emperor Ferdinand III., whose eulogium is prefixed, written in 20 languages of Europe and Asia. The work is full of quotations from Rabbinical, Arabian, and Syriac writers. 7. 'China illustrata.' 8. 'De prodigiosis Crucibus quæ post ultimum Incendium Vesuvii Montis Neapoli comparuerunt. 9. 'Scrutinium Pestis.' 10. 'Latium, i.e., nova et parallela Latii tum veteris tum novi Descriptio, qua quæcumque vel natura, vel veterum Romanorum ingenium admiranda efficit, geographico-historico-physico Ratiocinio, juxta rerum gestarum temporumque seriem exponitur et enucleatur,' fol., Amsterdam, 1671, with maps and figures, and a minute description of Hadrian's villa, with a plan of it. This work of Kircher is one of his best, and may still be read with profit.

KIRGHIS. [TURKISTAN.]

KIRKALDY, together with Burntisland, Dysart, and Kinghorn, returns a member to parliament. For details respecting the town see FIFESHIRE.

KIRKBY LONSDALE. [WESTMORELAND.]

KIRKCUDBRIGHT, THE STEWARTRY OF, is a maritime county in Scotland, bounded on the north and north-west by Ayrshire; on the east and north-east by Dumfriesshire, from which it is in part separated by the river Nith; on the south-west by the county of Wigton and Wigton Bay; and on the south and south-east by the Solway Frith, being comprised between 54° 45′ and 55° 20′ N. lat., and between 3° 35′ and 4° 40′ W. long. The figure of the county is nearly that of a rectangle, of which the greatest length, reckoning from Southerness Point to the north-west extremity of the shire, is 42 miles, and the greatest width, from the river Nith to Wigton Bay, about 30 miles. The area is about 864 square miles, or 552,960 imperial acres, and comprises the greater portion of the antient district of Galloway. [GALLOWAY.] The lands of this county, together with those of the adjoining shire of Wigton, were enclosed in the early part of the last century by stone walls, known throughout the country by the name of Galloway dykes. The introduction of this system of enclosing brought with it the necessity of throwing several of the smaller farms into one, and occasioned an insurrection among the peasantry, which was quelled with difficulty. The system has now stood the test of more than a century, and has tended greatly to promote the interest of the district and the increase of its population.

The coast, except in the upper part of Wigton Bay, is generally bold and precipitous. The surface of the county is rugged and barren, more particularly towards the sea-coast; but within the last forty years great improvements have taken place in the arable husbandry of the shire, and considerable tracts of land which were formerly unproductive have been brought into cultivation. 'The land towards the Frith,' says Mr James Webster, in his 'View of the Agriculture of Galloway, Edinb., 1794, 'abounding in little hills or knolls full of stones and projecting rocks, presents a surface of the roughest aspect, which, together with the almost total want of wood, renders the prospect unpleasing to the eye of the traveller.' Now however, according to the more recent account of Mr. MacCulloch (*Statistical Account of the British Empire*), the arable lands form about one-fourth of the entire surface, and are principally situated south of a line drawn from Dumfries to Gatehouse, a village on the river Fleet, the most fertile lying near the sea-coast and along the banks of the rivers Dee and Nith. The chief elevations are Blacklarg in the north, which rises to the height of 1950 feet; Cairnsmuir in the west (2598 feet); and Criffel, a detached mountain on the shore of the Solway Frith, whose summit is 1831 feet above the sea-level.

The prevailing soil is a thin brown earth resting either upon a gravel bottom, or else upon a rock of a rotten slaty substance, which is readily pulverized. It is but slightly retentive of moisture, and its average depth does not exceed four inches. Oats are the grain chiefly cultivated. The potato crops are considerable, and constitute a principal article of export to England, after supplying the inhabitants and feeding a great number of swine. The turnip crops are less extensive, although the soil is peculiarly fitted for them. The principal manures employed are lime and sea-shells, in addition to the dung produced upon the farm. The farms, which are let on leases of nineteen years, are for the most part small; for although the enclosing of the district occasioned a considerable diminution in the number of small farms, the lands are still more subdivided here than in most of the other counties of Scotland. There are however some large estates, and the principal farms are provided with threshing-mills. The average rent of land in 1810 was 7*s.* 3*d.* per acre, and the annual value of the real property of the county in 1815 was about 213,308*l.* The peculiar breed of horses which this and the adjoining county of Wigton formerly possessed, and which was known by the name of the Galloway breed, is now almost entirely unknown, its place having been supplied by horses of a larger size and better adapted to draught. The sheep upon the moors and high grounds are mostly of the black-faced breed, but those

which have been introduced into the lower districts are for the most part Cheviots, South Downs, and New Leicesters. The attention of the farmer is chiefly directed to the rearing of cattle for the Norfolk fairs, where they are sold to graziers, by whom they are fattened for the London market. The absence of plantations for the protection of the grazing districts was formerly, and still is in a less degree, a subject of regret; for although the climate in the lower districts is comparatively mild, and the continued rains which prevail along the west coast of Scotland are less frequent in Kirkcudbrightshire than in the adjoining county to the north, the easterly winds which usually set in during the spring months are most severe, and are said to retard vegetation, and to do more material injury to the cattle than all the storms of winter. This circumstance, added to the common practice of leaving the full-grown cattle exposed in the open air during the greater part of the year, has already led to the raising of plantations on some few estates, which the proprietors are now actively employed in extending. The woods of the earl of Galloway, which consist chiefly of oak and ash, have been found eminently useful in protecting the lands from the cold winds.

The county contains a variety of minerals, but they have been only in few instances turned to any profitable account, which is mainly owing to the total absence of coal and the general scarcity of other fuel. The lead-mines which were wrought some years since near Newtownstewart, and which produced on an average about 400 tons of ore annually, have been abandoned for the reason above stated; and the working of a rich iron-mine in the parish of Rerrick, which was conducted for several years by an English company, has been discontinued, partly for the same reason, and partly on account of the inconvenience attending the shipping of the ore.

Lime, coal, and freestone are all imported from the opposite coast of Cumberland. The only port of any note is the harbour of Kirkcudbright. Besides the numerous lakes distributed over the stewartry, all which are of small extent, there are two principal streams, the Dee and Urr. The former has its source near the north-western boundary of the shire, and after contributing its waters to those of Loch Ken, it issues from the southern extremity of the loch, and finally falls into the Bay of Kirkcudbright. The salmon-fisheries on this river are valuable. The Urr rises in a lake of the same name on the borders of Dumfriesshire, and discharges itself into the Solway Frith. Previous to the middle of the last century the roads, with the exception of that from Dumfries to Newtownstewart, were impassable for carriages, but at present the county is in most parts intersected with well-made and tolerably level roads, which are kept in excellent repair.

Cotton-works upon a large scale were erected some years back at Gatehouse, but having proved unprofitable to the proprietors, they were suffered to decline from year to year, and are now probably altogether discontinued. Besides this the county is said to possess no manufactures of importance, although it is remarked in the population returns for 1831 that the number of weavers was greater than could be entirely ascribed to the local consumption of the article produced.

The county is divided into 28 parishes, the united population of which in 1831 was 40,590, namely 18,969 males and 21,621 females, which were distributed among 8283 families, whereof 2826 were occupied in agricultural pursuits, and 2203 in trade and handicraft.

The chief towns are Kirkcudbright and New Galloway, the latter of which, although a royal burgh, is of inconsiderable extent and population, without funds or property of any description. The county sends one member to the imperial parliament.

KIRKCUDBRIGHT, the county town, is agreeably situated on the eastern bank of the estuary of the Dee, about five miles from the mouth of the Bay of Kirkcudbright, and 85 miles south by west from Edinburgh. It was antiently a burgh of barony under the Douglases when they were lords of Galloway, but upon the fall of that family it was erected by James II. into a burgh of regality by a charter dated Perth, 26th of October, 1455. The town is irregularly built, and consists of two principal streets at right angles to each other. The public buildings are a court-house, school-house, and gaol. The streets are lighted, cleansed, and protected by a police, the expense of which is defrayed from the burghal revenue, the inhabitants being subjected to no local tax whatever. The property of the burgh consists of landed property, fisheries, and ferryage, which produced in 1832 a revenue of 936*l*. The debt of the burgh at that time amounted to 4343*l*., and its annual expenditure to 864*l*. The living is in the presbytery of Kirkcudbright and synod of Galloway. The school is conducted by the rector and other masters, and the arrangements for promoting the improvement of the scholars are said to have been judicious and successful.

In the vicinity of the town are the vestiges of several of the fortresses of the antient lords of Galloway, among which may be mentioned the castle of Kirkcudbright, erected by the Maclellans, who still continue to derive the title of baron from this place. The harbour, which is considered the best on the south coast of Scotland, affords good anchorage and shelter. At the head of it is a beautiful and nearly insulated spot called St. Mary's Isle, the seat of the earl of Selkirk. The population of the burgh in 1831 was 2690. This town unites with Dumfries, Annan, Lochmaben, and Sanquhar in returning one member to parliament.

(Sinclair's *Account of the Agriculture of Scotland*, 4to., Edinb., 1795; MacCulloch's *Statistical Account of the British Empire*; *Beauties of Scotland*; *Parliamentary Papers*, &c.)

KIRKDALE, a parish of some extent, near Kirkby Moorside in Yorkshire, remarkable for a very antient church, with an Anglo-Saxon inscription of the date of Edward the Confessor, accompanying a rude representation of a sun-dial. Still more worthy of attention is a cavern in the oolitic limestone, not far from the church, which yielded a great quantity of bones, chiefly of extinct animals, and gave occasion to the publication of Dr. Buckland's valuable work the 'Reliquiæ Diluvianæ.'

This cave had a nearly level floor (parallel to the limestone strata); its extent, according to Young and Bird, was 245 feet; the height varied from 3 to 6 feet or more. On the rocky floor was generally a bed of mud, covered over by an irregular layer of sparry stalagmite, formed by the dropping of water containing carbonate of lime in solution; and it was in this stalagmite and in the mud below it that the bones were found.

Of the animals to which the bones belonged six were Carnivora, viz. hyæna, felis, bear, wolf, fox, weasel; four Pachydermata, viz. elephant, rhinoceros, hippopotamus, horse; four Ruminantia, viz. ox, and three species of deer; four Rodentia, viz. hare, rabbit, water-rat, mouse; five Birds, raven, pigeon, lark, duck, snipe.

The bones were almost universally broken; the fragments exhibited no marks of rolling in water, but a few were corroded; some worn and polished on the convex surface; many indented, as if by the canine teeth of carnivorous animals. In the cave the peculiar excrement of hyænas ('album græcum') was common; the remains of these predacious beasts were the most abundant of all the bones; their teeth were found in every condition, from the milk-tooth to the old worn stump: and from the whole evidence, Dr. Buckland adopted the conclusion, in which almost every subsequent writer has acquiesced, that Kirkdale Cave was a den of hyænas, during the period when elephants and hippopotami (not of existing species) lived in the northern regions of the globe, and that they dragged into it for food the bodies of animals which frequented the vicinity. (Buckland, in *Reliquiæ Diluvianæ*.)

KIRKHAM. [LANCASHIRE.]

KIRK SESSIONS. [SESSIONS, KIRK.]

KIRWAN, RICHARD, a chemical philosopher of considerable eminence, was born in Ireland about the middle of the last century, and died in 1812. He was intended for the profession either of law or medicine, and was sent to be educated by the Jesuits of St. Omer's. On the death of his brother however he succeeded to the family estate, left St. Omer's, and abandoned all thoughts of a profession. His whole life was devoted to the cause of philosophy, and he has also written on some subjects not immediately connected with it. His knowledge was extensive and his memory accurate; but though he lived at a time when Black, Cavendish, Priestley, and Scheele were greatly extending chemical science by their experiments, he does not appear to have contributed any very remarkable original discovery;

he was nevertheless usefully employed in many investigations.

About the year 1779, when he was residing either in London or its neighbourhood, he read before the Royal Society, of which he became a Fellow, several papers, and in 1781 the Copley medal was awarded to him. In 1789 he returned to Ireland, and was for some time president of the Royal Irish Academy, and he was elected member or associate of most of the literary societies of Europe.

It would be useless to attempt an analysis of the memoirs and works of Kirwan; they include not merely chemical subjects, but meteorology and mineralogy, and are diffused through the 'Transactions' of the Royal Society of London, those of the Royal Irish Academy, and other publications. One of his most remarkable separate works was 'An Essay on the Constitution of Acids,' in which he attempted to reconcile the antient chemical philosophy with modern discoveries. This work was translated into French by Lavoisier, with notes in refutation of its doctrines by Guyton-Morveau and Lavoisier, &c.

In this publication Kirwan regards inflammable air as the true phlogiston, and in every case as the principle of inflammability, and he supposes that combustion can be no other than the combination of vital air with phlogiston. Without disputing the experiment of the decomposition of water, he is of opinion that the inflammable air which is disengaged might be derived from the red hot metal. His reasonings were completely refuted by the French philosophers whom we have named, and Kirwan had the candour, too rarely exhibited, of admitting the erroneousness of his views.

In 1794 he published 'Elements of Mineralogy,' in two volumes 8vo. This work, though now of course obsolete, was unquestionably useful in extending the boundaries of the science of which it treated. His 'Geological Essays' have never been considered as equally useful; but his 'Essay on the Analysis of Mineral Waters' contained a collection of what had been previously done on the subject, with new, and, in many cases, useful directions for conducting the requisite processes.

In 1809 he published a work on logic, which furnished ample materials for critical severity.

KISTNA. [HINDUSTAN, p. 209.]

KITCHEN-GARDEN. Every one knows what is generally understood by this name, a kitchen-garden forming a sort of inseparable adjunct to every country house, to the mansion of the rich as well as to the humble cottage. In laying out the grounds of a country residence provision should be made for the site of the kitchen-garden. Though it should not obtrude on the ornamental ground immediately adjoining the house, the design of the whole should be so formed as to leave the kitchen garden in the most favourable situation with regard to aspect, soil, and water. The aspect should be open to the south, but sheltered on other sides, more especially from northerly and easterly winds, by rising ground or lofty trees at some distance. The surface should be nearly level, or in some cases, according to the pervious nature of the subsoil, it may be quite so; but, generally speaking, a gentle slope from north to south is best. The soil should consist of a rich loam, neither too light nor so adhesive as to be liable to bind strongly in dry weather. The depth of soil ought not to be less than two feet, and more is absolutely necessary for some kinds of vegetables. If the subsoil be very impervious it should be sub-trenched; and in doing this the undisturbed bottom of the whole area should form a regularly inclined plane towards a proper drain; or if more convenient the bottom may form several planes so inclined as to allow the water a descent to a drain running through the lowest points. In the formation of gardens this is frequently not sufficiently attended to; while care is taken that the surface of the soil should be fair to the eye, a comparatively unimportant circumstance. If the bottom be made as above directed, the most important and difficult part of the groundwork is accomplished.

Water is very frequently obtained by means of pumps placed in convenient situations throughout the garden; but this is not the best mode of supply, nor should it be resorted to except where there is no alternative. Much injury is done to vegetation by watering with cold spring water, or indeed with any water that is much colder than the soil and atmosphere in which the plants are placed. Plants, when not watered at all in dry weather, if they are only kept alive, succeed better when rain does come than others that are watered, or rather chilled with water at a comparatively low temperature. The injurious effects of chilling plants by the application of very cold water is often visible in plants of the cabbage kind. After being transplanted from the seed beds a quantity of cold water is immediately poured round their roots, the surrounding dry soil absorbs a great portion of this supply, the remainder is soon exhaled by evaporation, and the process is again repeated. Sudden extremes of heat and cold, moisture and dryness, derange the functions of the spongioles and roots; obstructions supervene, and occasion an accumulation of matter in the thicker parts of the root, which is the principal cause of what is called *clubbing*, or the formation of protuberances in cabbage-roots, a disease which proves a check to their future development by incapacitating their roots for a due transmission of nourishment. Water for the kitchen-garden should therefore be derived from ponds or large reservoirs fully exposed to the sun, and even these should be supplied by open rather than underground channels; they should also be shallow, for the following reason —the deeper the water the longer will a considerable portion next the bottom retain the temperature of its greatest density, about 40° Fahr. When the general temperature of water is above this the warmest is next the surface; and therefore the flow of water for the garden should be from the surface of the pond or reservoir. This may easily be effected by means of a floating or float-controlled sluice. When a broad sheet of water cannot be obtained for the supply of a garden some advantage will be gained by providing large cisterns in which water raised by pumps may be exposed to the air for some time previous to its being used.

The quantity of ground which a kitchen garden should contain must be regulated according to the number of individuals which it is required to supply. An acre is calculated to afford a tolerable supply for sixteen individuals, but much depends on the nature of the vegetables required. Potatoes, turnips, peas, and carrots are frequently obtained of better quality and at less expense from a field than from a garden. With respect to potatoes in particular, only early varieties are now generally cultivated in gardens. If the mansion be only fully occupied for a part of the season, the quantity of ground will require to be nearly as much as if the supply were required throughout the year. Thus for example, a considerable breadth may be found necessary for peas in spring, and the same may be occupied with brocoli in autumn; so that the ground which would be sufficient for a few months' demand may be made equally so for the whole season by a proper succession of crops. For similar reasons it will be found that where a steady supply is required, proportionably less ground will be requisite than when the demand alternately exceeds and falls short of the mean.

A moderate establishment will require two acres of kitchen-garden, and a large one five or six; and in either case it may be found necessary to have recourse to field culture for those productions to which that mode of rearing is more especially adapted.

The form of a kitchen-garden should be composed of straight lines. If rectangular, it will prove a saving of labour; for it is practically known that more time is required to trench a piece of ground of a triangular form, than if the same extent were in the shape of a square or parallelogram; and besides, labourers who may not happen to be accustomed to the method of working such figures as have inclined sides are liable to make the surface irregular. A range of forcing-houses is generally placed on the north side; and as the wall on that side is the most valuable for fruit-trees on account of its direct south aspect, it becomes desirable that it should be extended as much as possible on each or both ends of the range. The form of the kitchen-garden is consequently determined to be that of a parallelogram with the two long sides running due east and west. The melon-ground, containing also pits for culinary forcing, should form an adjoining compartment well sheltered and excluded from the view on account of the quantities of litter and other fermenting substances which it must necessarily contain.

It is found that grapes ripen better against a very high wall than they do when trained on a low one. The conclu-

sion to be drawn from this fact must be, that a greater accumulation of heat will take place in front of a wall 12 feet high than where the height is less, and consequently the trees, whilst they have space for a greater extension, enjoy an increased degree of warmth. Therefore it will be desirable that the walls of a kitchen-garden should not be less than the height above mentioned, with the exception of the one on the south, which may be only 10 feet, because it will occasion less shade; and if the wall on the opposite or north side be made 14 feet high instead of 12 feet, greater utility and a better effect will result. Once erected, walls are too valuable to be left unoccupied, and a border should accordingly be formed outside, as well as inside, for the reception of fruit-trees to be trained against them. This requires the enclosure of a slip, containing the wall-border, a walk, and a border between the latter and the outside fence. If this outside or *ring-fence* were formed of materials on which young trees could be trained, so as to fill any accidental vacancy that may occur on the principal walls, great advantages would accrue, for then the walls would always appear filled with trees in a bearing state. Such nursery trees should be carefully moved every second year, so that they may always be in a proper condition for their final destination.

The interior departments of the kitchen-garden are usually bounded by fruit-trees planted within two or three feet of the walks. Not only are bushes, such as gooseberries, currants, and raspberries, used for this purpose, but fruit-trees of various kinds. The latter are trained either as dwarfs by grafting apples on paradise stocks, and pears on quinces, and causing their branches to proceed from near the ground; or as espaliers. The latter were formerly more in use for training fruit-trees in kitchen-gardens than they are at the present time. Some object to their appearance, others to their expense compared with their utility. Their appearance is certainly not unsightly if they are not made too high; and although the old varieties of fruit-trees trained upon this plan were unprofitable, yet many of the new kinds will produce abundantly. They occupy very little space, and their shade, if not made higher than six feet, can be scarcely injurious, especially as it can be made to fall chiefly on the walk.

Very few of the subjects of kitchen-garden cultivation are indigenous; they are chiefly varieties of luxuriant habits, which are artificially maintained and augmented by the art of the cultivator. The principal means employed for rendering the soil of the kitchen-garden subservient to this purpose are,—the application of abundance of manure; trenching, digging, and otherwise stirring the soil; and a due rotation of crops. Manure supplied in abundance will generally produce luxuriance in vegetables, although sometimes a disagreeable rankness is communicated to the flavour. This is in a great measure corrected by trenching, which becomes occasionally highly necessary; and although expensive, it will always repay the cost, if judiciously performed, particularly if the soil be of a consolidating nature. Trenching exposes fresh soil, and gives rest to that which has been partially exhausted on the surface; it renders the soil pervious to water and air, and likewise for the roots of the plants; in wet weather the latter are free from stagnant moisture; and in drought they seldom suffer, because they have been able to penetrate the soil so far as to be beyond the reach of dryness. Moreover, if a thermometer is plunged in well loosened soil, after a few days of hot sun in March, it will be found to indicate a temperature many degrees above that in more compact earth, or where the soil has not been stirred for several years. The advantage of this communication of heat is obvious, especially when it is borne in mind that a number of kitchen-garden plants are natives of countries possessing a warmer soil and climate than those of Britain.

It is always advantageous to attend to a proper rotation of crops, especially where manure is not abundantly applied, nor trenching performed. One kind of plant should not immediately follow another of the same nature, or one closely allied.

The following arrangement of Vegetables, according to the natural order [illegible] which they belong, will exhibit at one view the ch[illegible]es which may be made, more concisely and yet more perfectly than could be done in any other way: thus No. 2 or 3 may succeed No. 1, and the contrary. In short, the plants of any one order may alternate with those of another, as is found most convenient.

1. *Brassicaceæ*, including the Cabbage tribe, Turnip, Radish, Sea-kale, Mustard, Garden-cress, Water-cress, Horse-radish, and Scurvy-grass.
2. *Fabaceæ, or Leguminosæ*. Pea, Bean, Kidney-bean.
3. *Solanaceæ*. Potatoe, Love-apple, Egg-plant, Capsicum.
4. *Compositæ*. Jerusalem-artichoke, Artichoke, Cardoon.
5. *Apiaceæ, or Umbelliferæ*. Carrot, Parsnip, Skirret, Celery, Parsley, Fennel, Dill, Chervil, Anise, Caraway, Coriander.
6. *Chenopodiaceæ*. Beet, Spinach, Orach.
7. *Cichoraceæ*. Lettuce, Endive, Succory, Salsify, Scorzonera.
8. *Polygonaceæ*. Rhubarb, Sorrel.
9. *Liliaceæ*. Onion, Leek, Garlic, Shallot, Rocambole, Chives, Asparagus.
10. *Cucurbitaceæ*. Cucumber, Gourd.
11. *Lamiaceæ, or Labiatæ*. Thyme, Sage, Mint, Savory, Basil, Marjoram, Lavender, Hyssop, Rosemary, Balm, Clary.

The limits of this article will not admit of a detailed account of the various modes of culture; those who wish for extensive information upon this subject are referred to 'Loudon's Encyclopædia of Gardening,' or to the 'Guide to the Orchard and Kitchen-Garden.'

The following list will however show what description of plants a kitchen-garden should contain, and the different purposes to which they are applied:—

1.—*Oleraceous Plants*, consisting chiefly of the Cabbage tribe; 1. *White close-headed* (Early Dwarf, Early York, Early Battersea, Vanack, Portugal, or Cove Tronchuda). 2. *Red Cabbage* (Large Red, Small dark Red). 3. *Cauliflower* (Early, Late). 4. *Broccoli* (Purple Cape, Early White, Grange's Early Cauliflower, Cream-coloured or Portsmouth, Sulphur-coloured, Late Green or Siberian). 5. *Savoy* (Early Dwarf, Yellow, Large Green). 6. *Borecole* (Large Curled, Dwarf Curled, or Scotch-kale, Purple-kale, Variegated Borecole, chiefly used for garnishing, Buda-kale, Egyptian-kale). 7. *Brussels Sprouts*, the finest and hardiest of Winter Greens; they have been known to withstand the most intense frost that has ever occurred in Britain.

Sea-kale and *Asparagus* may also be included in this division.

2. *Roots or Tubers*.—1. *Potatoes* (Ash-leaved Kidney, Early Manly, Champion, Shaw's Early, Red-nosed Kidney, Lancashire Red, or Scotch Pink-eye, Bread-fruit; for a general supply in winter and spring the two last-mentioned sorts probably cannot be excelled). 2. *Turnips* (Early Flat White, Early Stone, Teltow, Maltese). 3. *Jerusalem Artichoke*. 4. *Carrots* (Early Horn, Long Orange, Long Red, Altringham). 5. *Parsnips* (Hollow-crowned). 6. *Beet, Beet-root, or Betterave* (Red Castelnaudari, Yellow Castelnaudari). *Skirret*. 8. *Salsify*. 9. *Scorzonera*. 10. *Radishes* (Scarlet, Salmon-coloured, Early White Turnip-rooted, Crimson Turnip-rooted, White Spanish, Black Spanish).

3. *Pulse*.—1. *Peas* (Early Dwarf, Early Frame, Early Charlton, D'Auvergne, Knight's Dwarf Marrow, Knight's Tall Marrow, Blue Prussian, White Prussian, Large Crooked Sugar, Groom's Superb Dwarf Blue). 2. *Beans* (Early Mazagan, Green Long-pod, Windsor, Dutch Long-pod). 3. *Kidney-beans and Runners* (Early Cream-coloured, Negro; these two sorts are very proper for forcing; Black-speckled, Red-speckled; Scarlet Runner, White Dutch Runner).

4. *Salads*.—1. *Lettuce* (Hardy Hammersmith, Tennis-ball, Large White Malta, or White Silesian; the preceding are varieties of Cabbage Lettuces, the following are Cos, or upright-growing sorts, Egyptian, or Early Green, Brown, Paris Cove, Alphange). 2. *Endive* (Broad-leaved Batavian, Small Batavian, Small Green-curled, Large Green-curled). 3. *Succory*. 4. *Celery* (White solid, Red solid, Violet). The following plants of a pungent nature are also used as salads: 5. *Mustard* (White). 6. *Garden-cress*. 7. *American-cress*. 8. *Water-cress*. 9. *Scurvy-grass*. 10. *Wood-sorrel*. 11. *Radishes*.

5. *Alliaceous Plants*.—1. *Onions* (Early Silver-skinned, Yellow or Straw coloured; these are esteemed the best sorts for pickling; Strasburg, Ognon pyriforme, or James's Keeping, Blood-red, Flat or Round Tripoli, Deptford, Globe).

2. *Leek* (London Flag). 3. *Garlic.* 4. *Shallot* (Long-keeping). 5. *Rocambole.* 6. *Chives.*

6. *Spinaceous Plants.*—1. *Spinach* (Round-leaved, Flanders, the former for summer and the latter for winter use). 2. *New Zealand Spinach* (Tetragonia expansa), useful in dry summers as a substitute for the Round-leaved. 3. *Leaf-beet* (Green, White, Yellow, Red). 4. *Orach* (Pale Green, Purple).

7. *Condiments.*—1. *Parsley* (Curled). 2. Fennel (Common, Dwarf, or *Finochio*). 3. *Dill.* 4. *Chervil.* 5. *Taragon.* 6. *Caraway.* 7. *Anise.* 8. *Coriander.* 9. *Savory* (Winter, Summer). 10. *Basil* (Sweet, Bush). 11. *Marjoram* (Winter, Sweet, Pot). 12. *Thyme* (Common, Lemon). 13. *Sage* (Green, Purple, Broad-leaved, Narrow-leaved). 14. *Tansy.* 15. *Horse-radish.* 16. *Nasturtium* or *Indian Cress.* 17. *Mint* (Spearmint, Peppermint)

8. *Fruits.*—1. *Cucumbers* (Russian, Long Prickly, Short Prickly). These are sorts proper for ridging out in the open ground for the purpose of pickling. 2. *Gourds* (Vegetable Marrow, Large Yellow). 3. *Love Apples*, or *Tomatoes* (Large Red, Large Yellow). 4. *Egg Plants* (White, Purple). 5. *Capsicums* (Cayenne Pepper, Cherry Pepper, Large Tomato Capsicum, Chillies, those with very hot, upright pods; there are red, yellow, and black varieties).

9. *Miscellaneous.*—1. *Artichoke* (Globe, Conical). 2. *Cardoon* (Spanish). 3. *Rhubarb* (Buck's, Siberian, Elford, Hybrid). 4. *Sorrel* (French). 5. *Lavender.* 6. *Hyssop.* 7. *Rosemary.* 8. *Balm.* 9. *Clary.* 10. *Marigold.* 11. *Chamomile.* 12. *Liquorice.* Of these the Rhubarb is certainly the most useful: several of the others, though generally considered as belonging to kitchen-gardens, are seldom required.

KITE. [FALCONIDÆ, vol. x., p. 187.]

KITTIWAKE. [LARIDÆ.]

KIVA. [TURKISTAN.]

KIZIL IRMA'K, or ERMA'K (the Red River), is a river in Asia Minor, known to the antients under the name of Halys. Though traversing a country which has been known to Europeans for more than 2000 years, the course of this river has only very recently been accurately laid down on our maps. Brant, in 1835, found that the source of the Kizil Irmák is not in a range west of the town of Sivas, but runs down to that town from the range called the Ak Dagh, in a southern direction. Though Sivas is not far from its source, it is a considerable river at that town, and timber for building and fuel are brought down by it from the mountains in which it rises. (*London Geogr. Journ.*, vi. 214.) After watering the fertile plain of Sivas, which is from 15 to 20 miles in length, it turns to the westward, and in approaching Kaisariyeh it is joined by the Kará-su river, which brings to it the waters collected on the mountains near that town, and particularly those from the snow-capped mountain-mass of Argæus. The Kizil Irmak, continuing its general western course, enters the arid plains of the table-land of Asia Minor, but does not appear to receive any considerable river from the south, and the stream which, in most maps, falls into it from the south near 34° E. long., seems to be imaginary. Between 33° and 34° E. long. the river makes a great bend, by which its western course is changed into a north-eastern. It afterwards turns to the north, and in approaching the Black Sea suddenly directs its course to the east, until it again resumes its north-eastern course a short distance from its mouth, which is less than 10 miles below Bafra. The whole course of the Kizil Irmak is not much short of 500 miles. Nothing is known respecting the extent to which it is navigable, nor where it descends from the table-land, nor whether it forms any cataracts in its descent.

(Brant and Hamilton, in *London Geogr. Journal*, vi. and viii.)

KLAPROTH, MARTIN HENRY, a distinguished analytical chemist, was born at Wernegerode in Upper Saxony on the 1st December, 1743. It was his intention to study theology; but the severe treatment which he met with at school disinclining him to study, he preferred the profession of an apothecary, and he accordingly spent seven years in the public laboratory at Quedlinburg, where he learnt little else than how to manipulate in pharmaceutical operations.

After spending two years in the public laboratory at Hanover, he went to Berlin, and in 1770 to Danzig, in both which places he was an assistant in a laboratory; he afterwards returned to Berlin as an assistant to Valentine Rose, one of the most distinguished chemists of the day, and on his death in 1771 he succeeded him, having, at the request of Rose, undertaken the superintendence of his office and the education of his two sons. In 1780 he underwent the necessary forms and examinations for the profession of an apothecary with great applause. His thesis 'On Phosphorus and Distilled Waters' was printed in the 'Berlin Memoirs' for 1782.

His various analyses and contributions to chemical science were diffused through periodical publications till 1796, when he began to collect and publish them. This work, under the title of 'Contributions to the Chemical Knowledge of Mineral Bodies,' was published in German; the last and sixth volume appeared in 1815, about a year before the death of the author. Besides this work, which contained 207 treatises, he published a Chemical Dictionary jointly with Professor Wolff, and he superintended a new edition of Gren's 'Manual of Chemistry.'

To enumerate the various minerals which he analyzed by processes perfectly new and peculiar, and with greater accuracy than had ever before been practised, would be tedious; we may however mention, as the results of these labours, the discovery of the peculiar metal uranium in pechblende, and the earth zirconia in the hyacinth; he also more perfectly detailed the properties of titanium, which had previously been discovered by Gregor in Cornwall, and of tellurium, which had been noticed by Müller as a peculiar metal.

There were many minerals which, when Klaproth began their analysis, he found it extremely difficult to render soluble in acids, and without this it was in many cases impossible to arrive at a correct result; among these bodies was the corundum, or adamantine spar. This substance, though consisting almost entirely of clay or alumina, so long resisted all previously known means of analysis, that Klaproth at first regarded it as a peculiar and distinct earth. He found however that by treatment with caustic potash, instead of the carbonate, in a silver crucible, this refractory mineral was at length rendered soluble in acids, and was in fact alumina.

Numerous other improvements were introduced by this laborious and accurate analyst, into the processes of the chemist; the above is not the least important, and has therefore been referred to as a specimen of the value of his contributions to science.

The above process was of itself sufficient to alter the face of mineralogy, and indeed it is hardly asserting too much when we state that of all analyses previously performed scarcely half a dozen were correct. The great services thus rendered to chemistry and mineralogy were duly appreciated; about 1787 he was elected a member of the Royal Academy of Arts; and the year following he was chosen a member of the Royal Berlin Academy of Sciences. In 1782, he was made assessor in the Supreme College of Medicine and Health, and he was professor of chemistry in the Royal Mining Institute; he had also other honourable appointments; and in 1811 the king of Prussia added the Order of the Red Eagle of the third class.

Klaproth married about 1783; his wife died in 1803, and they had three daughters and a son, who survived their parents. Klaproth died at Berlin on the 1st of January, 1817, in the 74th year of his age.

KLEENEBOK. [ANTELOPE, vol. ii., p. 82.]

KLEIST. [GERMANY, *Literature*.]

KLIPSPRINGER. [ANTELOPE, vol. ii., p. 77.]

KLOPSTOCK, FRIEDRICH GOTTLIEB, was born at Quedlinburg, in the year 1724, of respectable parents, and frequented the gymnasium of that place. In his sixteenth year he went to the school at Naumburg, where his poetical character was first developed. Here he perfected himself in the antient languages, and even at this early age resolved to compose a long epic poem, though he had not yet made up his mind as to the subject. At first he thought of making the Emperor Henry I., commonly called 'the Fowler,' the hero of his work, and s[illegible]odes by him on this sovereign show that he was then uppermost in his mind. In 1745 he studied theology at Jena, where he seems to have decided on making the Redeemer the subject of his epic, for it was then that he projected the first canto of his 'Mes-

siah,' and in 1748 the first three cantos appeared. The excitement created by this poem was surprising; some regarded him as an ectype of the antient prophets, while others deemed his poetical treatment of so sacred a subject profane and presumptuous. In the same year he went to Langensalza to superintend the education of the children of a relation named Weiss, with whose daughter he fell in love, but without a return of his passion. This lady was the 'Fanny' of his odes. Bodmer, the Swiss poet, invited him to Switzerland, where his poem had made a great impression. In Switzerland he was received with a reverence that bordered on adoration (1750). While in this country his mind seems to have taken a patriotic tendency: the antient Hermann (the Arminius of Tacitus) became his favourite hero, whose deeds he afterwards celebrated in some dramatic works. In Denmark the minister Bernstoff had become acquainted with the three cantos of the 'Messiah,' and Klopstock was offered a pension of 400 dollars on condition of coming to Copenhagen and there finishing his poem. He set off in 1751, travelled through Brunswick and Hamburg, and at the latter place formed an intimacy with Margaretha Moller, daughter of a respectable merchant. At Copenhagen he was received by Bernstoff with the greatest respect, and introduced to the king, Frederick V., whom he accompanied on his travels. In 1754 he went to Hamburg, and there married his beloved Margaretha, who in 1758 died in childbed. From 1759 to 1763 he lived alternately in Brunswick, Quedlinburg, and Blankenburg, but afterwards returned to Copenhagen. He composed in 1764 his drama 'Hermannsschlacht' (the battle of Arminius), the subject of which is the defeat of the Roman general Varus by the antient Germans, and which is scarcely so much a drama, as a lyric poem in a dramatic form. His other dramas are of a similar character. In 1771 he left Copenhagen and settled at Hamburg, where he completed his 'Messiah,' and in 1792 married a second wife. He died in 1803.

Though Klopstock is still read and admired as a classic author, that adoration which was paid him has long since evaporated, and many have questioned whether he was a poet at all in the genuine sense of the word. Both in his 'Messiah' and his odes he is dignified and sublime, but his rhapsodical manner contrasts strangely with the pedantry which is always apparent. Goethe, in his conversations with Eckermann, expressed his opinion that German literature was greatly indebted to Klopstock, who was in advance of his times, but that the times had since advanced beyond Klopstock, and that a modern poet would do wrong to take him as a model. The young Hardenberg (who wrote under the name of 'Novalis') has happily said that Klopstock's works always resemble translations from some unknown poet, done by a clever but unpoetical philologist. Notwithstanding the grandeur of his 'Messiah,' it is exceedingly tedious to read; and even at the time of Klopstock's greatest popularity this seems to have been felt, for Lessing (his contemporary) observes, in an epigram, that everybody praises Klopstock, but few read him. His odes are valued by his own countrymen more than his epic, and some are truly sublime; but the construction of the language is so singular, and the connection of the thoughts so often nonapparent, that these odes are reckoned among the most difficult in the language.

KNARESBOROUGH. [YORKSHIRE.

KNELLER, GODFREY, was born in 1648, in the city of Lübeck, and received his first instruction in the art of painting in the school of Rembrandt. He afterwards became a pupil of Ferdinand Bol. Having acquired sufficient acquaintance with his profession to qualify him to travel with advantage, he went first to Rome and afterwards to Venice, where he painted several portraits of noble families, and some historical pictures, with such success as to gain him considerable reputation, even in Italy. Leaving Venice, he went to Hamburg, where he met with extraordinary encouragement, and lastly came to London. Being patronised by the duke of Monmouth, he was introduced to King Charles II., whose portrait he painted several times. The death of Sir Peter Lely leaving him without a competitor, the remainder of his life was a career of fame and fortune. He had incessant employment, and was distinguished by many public marks of honour. He was state painter to Charles II., James II., William III, Queen Anne, and George I. The emperor Leopold made him a Knight of the Roman Empire, the grand-duke of Tuscany asked for his portrait to place it in the Gallery at Florence, and his works were celebrated by the first poets of his time.

Kneller had much of the freedom of Vandyck, but less nature. His outline is bold, his attitudes are easy and not without dignity; his colouring is lively, the air of his heads generally graceful, and there is a pleasing simplicity in his portraits combined with a considerable degree of elegance. But there is also a monotony in the countenances and a want of spirit in his figures. Thus the beauties of the court of William III., painted by order of the queen, are very inferior and tame, in comparison with Sir Peter Lely's beauties of the court of Charles II. In the collection of the marquis of Bute at Luton House there is a portrait of Sir John Robinson by Kneller, which, says Dr. Waagen, is far more elevated and free in the conception than usual, more carefully finished, and so warm in the colouring, that we recognise the scholar of Rembrandt. Sir Godfrey died in 1726, at the age of 78.

KNIGHT, KNIGHTHOOD. During the prevalence of the feudal system, when the military strength of the nation was measured by the number and efficiency of the knights whom the sovereign was able to summon to the field, a regular supply of persons qualified to perform in an effectual manner the services annexed to their tenures was a matter in which the public as well as the crown were deeply interested; and the common law adopted that part of the feudal system which enabled the king, by process of distress [DISTRESS], to compel those who held knight's fees [KNIGHT'S FEES] to take upon themselves the order of knighthood, or, in other words, to prove, by their reception into that order, that they had received the training and possessed the arms and accoutrements, and were, as to other requisites, qualified to take the field as knights. The statute, or rather the grant of 1 Edward II. enrolled in parliament, called 'Statutum de Militibus,' appears to have been made, partly as an indulgence upon the commencement of a new reign, and partly for the purpose of removing some doubts which existed as to the persons liable to be called upon to receive knighthood. The king thereby, in the first place, granted a respite until the following Christmas to all those who ought to have become, but were not knights, and were then distrained ad arma militaria suscipienda. Further, it directed that if any complained in chancery that he was distrained and had not land to the value of forty pounds in fee, or for term of his life, and was ready to verify that by the country (i.e. by the decision of a jury), then some discreet and lawful knights of the county should be written to, in order to make inquisition of the matter, and if they found it to be so, he was to have redress, and the distress was to cease. Again, where a person was impleaded for the whole of his land, or for so much of it that the remainder was not of the value of forty pounds, and he could verify the fact, then also the distress was to cease till that plea was determined. Again, where a person was bound in certain debts atterminated in the exchequer at a certain sum to be received thereof annually (i.e. respited, subject to payment by instalments), and the remainder of his land was not worth forty pounds per annum, the distress was to cease till the debt was paid. No one was to be distrained ad arma militaria suscipienda till the age of twenty-one, or on account of land which he held in manors of the antient demesne of the crown as a sokeman, inasmuch as those lands were liable to pay a tallage when the king's lands were tallaged. With respect to those who held land in socage of other manors, and who performed no servitium forinsecum, or service due upon the tenure, though not expressed in the grant, the rolls of chancery in the times of the king's predecessors were to be searched, and it was to be ordered according to the former custom; the same of clerks in holy orders holding any lay fee, who would, if laymen, have been liable to become knights. No one was to be distrained in respect of property of burgage tenure. Persons under obligation to become knights, who had held their land only a short time, were extremely old, or had an infirmity in their limbs, or had some incurable disease, or the impediment of children, or law-suits, or other necessary excuses, were to appear and make fine before two commissioners named in the act, who were to take discretionary fines from such disabled persons by way of composition. Under this regulation those who were distrained upon as holding land of the value of 40*l.* per annum either received knighthood or made fine to the king. The alteration in the nominal value of money occasioned by the

increased quantity of the precious metals, and still more by successive fraudulent degradations of the standard, gradually widened the circle within which estates were subjected to this burthen; and in the sixteenth and seventeenth centuries lands which, in the reign of Edward II., were not perhaps worth 4*l.* per annum, had risen in nominal value to 40*l.*, and were often held by persons belonging to a totally different class from those who were designated by 1 Edward II., stat. 1, as persons having 40 libratas terræ.

That power of compelling those who refused to take upon themselves the order of knighthood, or rather of distraining them till they received knighthood, or compounded with the king by way of fine, which originally was a means of enforcing the performance of a duty to the crown and to the public, by persons holding a certain position and having a certain stake in the country, was perverted into a process for extorting money from those who would have been exempt at common law, which regulated the amount of a knight's fee by the sufficiency of the land to support a knight, and not by its fluctuating nominal value in a debased currency. This oppressive, if not dishonest proceeding, which was occasionally resorted to in the reigns of Edward VI. and Elizabeth, was reduced into a system by the rash advisers of Charles I., and was adopted by that unfortunate prince as one of the modes by which money might be raised without resorting to a parliament for assistance. The undisguised manner in which this antient prerogative was thus abused, led to its total abolition. By 16 and 17 Car. I., c. 20, it is enacted, that none shall be compelled, by writ or otherwise, to take upon him the order of knighthood, and that all proceedings concerning the same shall be void.

Persons have been required to take upon themselves the order of knighthood as a qualification for the performance of honourable services at coronations, in respect of the lands which they held by grand serjeanty.

Knighthood in England is now conferred by the king (or queen when the throne is filled by a female) by simple verbal declaration attended with a slight form, without any patent or other written instrument. Sometimes, but rarely, knighthood is conferred on persons who do not come into the presence of royalty. This is occasionally done to governors of colonies, and other persons in prominent stations abroad. The lord-lieutenant of Ireland has a delegated authority of conferring this honour, which is very sparingly exercised.

Knighthood gives to the party precedence over esquires and other untitled gentlemen. 'Sir' is prefixed to the baptismal name of knights and baronets, and their wives have the legal designation of 'Dame,' which is ordinarily converted into 'Lady.'

A rank correspondent to our rank of knighthood has been found in all Christian countries. Some regard it as a kind of continuation of the equestrian order among the Romans. But it is safer to regard it as originating in Christian times; and the eleventh and twelfth centuries have been named as the period to which the order of knighthood as now existing may be traced. In such an inquiry there are two difficulties: first, to state with sufficient precision what is the thing to be proved; and, secondly, to obtain evidence of the commencement of an institution which probably grew, almost insensibly, out of a state of society common to the whole of civilized Europe.

It was a military institution, but there appears to have been something of a religious character belonging to it, and the order of knighthood, like the orders of the clergy, could be conferred only by persons who were themselves members of the order.

In early times some knights undertook the protection of pilgrims; others were vowed to the defence or recovery of the Holy Sepulchre. Some, knights-errant, roved about 'seeking adventures,' a phrase not confined to books of romance, of which there are many on this subject, but found in serious and authentic documents.

There is a treatise by Bishop Hurd on chivalry.

But besides those who are simply knights, there are knights who are members of particular orders or classes.

These orders are found in most of the kingdoms of modern Europe, and have had generally for their founder a sovereign prince. Such are the order of the Golden Fleece, instituted by Philip duke of Burgundy; the order of the Holy Ghost, instituted by Henry the Third of France; the order of St. Michael, instituted by Louis the Eleventh of France. Of the foreign orders, which are very numerous, a full account may be found in a work in two volumes octavo, entitled 'An Accurate Historical Account of all the Orders of Knighthood at present existing in Europe,' a work printed abroad, the author of which was Sir Levet Hanson, an Englishman. Each of these orders has its peculiar badge, ribbons, and other decorations of the person. The three great British orders, the Garter, the Thistle, and Saint Patrick, belong to this class.

The Garter may claim to be considered as the most antient, and is indisputably the most illustrious order existing. It was founded by King Edward the Third soon after his return from his expedition to France and his victory at Cressy. The persons admitted into it were for the most part the soldiers who had most distinguished themselves in the expedition. The number of persons admitted was twenty-five, besides the king himself. It had a bishop for its prelate, and other officers. It has flourished in unabated splendour from the time of its foundation, the knights having been the most eminent persons of the English nation, together with many illustrious foreigners, of whom the greater part have been sovereign princes. The number was strictly confined to twenty-five, and so continued till the reign of George the Third, when a new statute was made that the knights should be twenty-five, exclusive of any members of the royal family who should be admitted into the order. Another statute has since been made that the number should be twenty-five, without reckoning the illustrious foreigners who might be admitted into the order. The history of the Order of the Garter has been treated of in a work by Elias Ashmole, a herald of the reign of Charles the Second: and there is a later and more important work on the same subject by John Anstis, who was the Garter King at Arms.

The Order of the Thistle was instituted in 1540, by James the Fifth, king of Scotland; but it fell into decay, till in the reign of Queen Anne, 1703, it was revived. The number of knights was limited to thirteen, but in 1827 the number was increased to sixteen, all of whom are nobility of Scotland.

The Order of St. Patrick was instituted in 1783. The knights were fifteen, increased in 1833 to twenty-two, who are peers of Ireland.

The order of the Bath differs in some respects from those just spoken of. Knights of the Bath are found in the early history of the English sovereignty, being persons, in number indefinite, who were made knights in some peculiar manner, of which *bathing* constituted a part of the ceremonies, a coronation, royal marriages, or when the king's eldest son was made a knight. Such were the knights of the Bath till the reign of King George I., who cast them into an order consisting of thirty-six knights with a grand master at their head. The order so continued till the close of the war with Napoleon, when, during the regency (1815), the order was greatly extended, and the persons composing it were thrown into three classes: the Knights Grand Crosses, the number of whom is not to exceed seventy-two; the Knights Commanders, the number of whom is not absolutely limited, but at the beginning not exceeding one hundred and eighty Englishmen and ten foreigners; and the Companions.

There are also knights of the Guelphic order, and knights of the Ionian order of Saint Michael and Saint George.

KNIGHT OF THE SHIRE is the designation given to the representative in parliament of English counties at large, as distinguished from such cities and towns as are counties of themselves (which are seldom, if ever, called shires), and the representatives of which, as well as the members for other cities and towns, are denominated citizens or burgesses. Though the knights of the shire always sat with the citizens and burgesses as jointly representing the third estate of the realm, as well during the time that the three estates, viz. the spiritualty, the lords temporal, and the commons, sat together, as since, we find that grants were occasionally made by the knights to be levied on the counties, whilst separate grants were made by the citizens and burgesses to be levied upon the cities and boroughs. (*Rot. Parl.*) The wages payable to knights of the shire for their attendance in parliament, including a reasonable time for their going up and coming

down, were four shillings a day, being double what was received by citizens and burgesses. At the close of every session of parliament the course was for the king, in dismissing them to their homes, to inform them that they might sue out writs for their wages, upon which each knight separately obtained a writ out of Chancery directed to the sheriff, mentioning the number of days and the sum to be paid, and commanding the sheriff to levy the amount. Upon this the sheriff, in a public county court, divided the burthen amongst the different hundreds and townships, and issued process to levy the amount, which, to the extent of the money levied, he paid over to the knight. The lands of the clergy, as well regular as secular, were exempted from contributing towards these expenses, because the clergy formed a distinct estate, and were represented in parliament by their prelates and the procuratores cleri, although the latter were, as Lord Coke expresses it, voiceless assistants only. All lay fees within the county were liable to contribute, except lands belonging to the lords and their men. The lords insisted that this exemption extended to every freeholder who held land within their baronies, seigniories, or manors, alleging that they served in parliament at their own expense for themselves and their tenants. And such was undoubtedly the practice; as by the Parliament Roll it appears that the commons frequently petitioned that the exemption should be confined to such lands as the lords kept in their own hands and occupied by their farmers or by their bond-tenants, or villeins. These requests however were met either by a simple refusal or by a statement by the king that he did not mean to lessen the liberties of the lords. If however a lord purchased land which had previously been contributory to the knight's wages, the liability continued. Freehold lands, held either by knight's service or in common socage, were liable to this burthen, but customary tenures in antient demesne and tenures in burgage were exempt. In the county of Kent no socage land was contributable, the whole burthen being thrown upon those who held knight's fees, an anomaly against which the commons preferred many ineffectual petitions. Knights of the shire, and also their choosers, were formerly required to be persons either resident or having a household in the county. This regulation, though confirmed by several statutes, had fallen into neglect, and was formally abrogated in both its branches by 14 George III., c. 58. The removal of the latter part of the restriction has greatly added to the expense of county elections; and though the Reform Act, 2 Will. IV., c. 45, disfranchises out-voters in boroughs, it does not restore the old law as to non resident county electors. (*Rot. Parl.*, vol. ii., 258, 287; iii., 25, 44, 53, 64, 212; iv., 352.)

KNIGHT'S FEE was land of sufficient extent and value to support the dignity of a knight, granted by the king, or some inferior lord, upon the condition that the grantee and his heirs should either perform the service of a knight to the grantor and his heirs, or find some other person to do such service. The quantity of land capable of supporting a knight naturally varied according to its quality and situation; and even the amount of income sufficient to meet the charges of a knight would fluctuate according to time and place. It is not therefore surprising that we find a knight's fee sometimes described as consisting of 800 acres, sometimes of 680; sometimes estimated at 15*l.*, sometimes at 20*l.*, and in later times at 40*l.* per annum. If the owner of a knight's fee deprived himself of the possession of part of his land by subinfeudation he remained liable to the feudal burthen attached to the tenure of the whole.

KNIGHT'S SERVICE, TENURE BY, otherwise called tenure in chivalry, or per service de chivaler, per servitium militare, was, from the times immediately succeeding the Norman Conquest in the eleventh century to the period of the civil war in the seventeenth, considered the first and the most important, as it was also the most general, mode of holding land and other immoveable property in England. The land held by this species of tenure was said to consist of so many knight's fees, feoda militis, *i.e.* so many portions of land capable of supporting the dignity of a knight. [KNIGHT'S FEE.] He who held an entire knight's fee was bound by his tenure, when called upon so to do, to follow his lord to the wars (under certain restrictions as to the place at which the service was to be performed), and to remain with him forty days in every year, or to send some other knight duly qualified to perform the services. From the owner of half a knight's fee twenty days' attendance only could be required; and the obligation attaching to the quarter of a knight's fee was satisfied by the performance of ten days' service. On the other hand, a person holding several knight's fees, whether forming one or several estates, was bound to furnish a knight in respect of each.

Besides this permanent liability to military service, the tenant was subject to other occasional burthens. The principal of these are the following incidental services:—First, *Aids*, or payments which the vassal holding by knight's service was bound to make for ransoming his lord's person if taken prisoner; for making the lord's eldest son a knight; and for marrying, *i.e.* providing a marriage portion for the lord's eldest daughter. Secondly, *Reliefs*, being a payment made by the heir in the nature of a composition for leave to enter upon land descending to him after he had attained his full age. Thirdly, *Primer Seisin*, or the right of the crown, where the lands were held of the king, to a year's profit of land descending to an heir who was of full age at the time of the death of his ancestor. Fourthly, *Wardship*, or the right to the custody of the body and lands of an heir to whom the land had descended during his minority, the king or other lord in such case taking the profits of the land during the minority to his own use, or selling the wardship to a stranger if he thought proper. Fifthly, *Marriage*, or a right in the lord, where the land descended to an heir within age, to tender to him or her a wife or a husband; and if the heir refused a match without disparagement, *i.e.* without disparity of rank, crime, or bodily infirmity, the lord became entitled to hold the land as a security for payment by the heir of the amount for which the lord had sold or which he might have obtained for the marriage. Sixthly, *Fines upon Alienation*. To these Blackstone adds a seventh, *Escheat*, or the returning of the land to the lord upon the felony or forfeiture of the tenant, or his dying without heirs. [ESCHEAT] But escheat is not peculiar to tenure by knight's service.

This system, which Blackstone justly characterizes as a complicated and extensive slavery, fell to the ground during the existence of the Commonwealth; and the abolition of this species of tenure was confirmed upon the Restoration, as it would have been absurd and dangerous to attempt a renewal of such oppressive burthens. Accordingly the 12th Car. II., c. 24, takes away tenure by knight's service, whether the lands are held of the crown or of a subject, together with all its oppressive fruits and peculiar consequences, and converts every such tenure into free and common socage. [SOCAGE.] Nothing can be more comprehensive than the terms of this act; besides generally abolishing tenure by knight's service, and its consequences, it descends into particulars, with a redundancy of words, which appear to indicate an extreme anxiety to extirpate completely all the evils which the legislature had under contemplation. The statute, after taking away the court of wards and liveries, enumerates wardships, liveries, primer seisins or ousterlemains, values and forfeitures of marriages, and fines, seisures, and pardons for alienation, and sweeps away the whole. But rents certain, heriots [HERIOT], suit of court and other services incident to common socage, and fealty [DISTRESS], and also fines for alienation due by the customs of particular manors, are preserved. Reliefs for lands, of which the tenure is converted into common socage, are saved in cases where a quit-rent is also payable.

KNIGHT, RICHARD PAYNE, eldest son of the Reverend Thomas Knight, of Wormesley Grange, in the county of Hereford, was born in 1750. He was a weak and sickly child, and his father did not send him to school, or suffer him to learn either Greek or Latin at home. Soon after his father's death, which took place in 1764, he was sent to a grammar-school in the neighbourhood, where he made a very rapid progress in the Latin language. After leaving school he did not go to a university, but at the age of eighteen he commenced the study of Greek, which he pursued with great diligence, and which became one of the chief occupations of his life. Shortly afterwards he visited Italy, principally on account of his health; and here he seems to have formed the taste for the fine arts, and especially for the productions of the Greek sculptors, which was his most prominent characteristic. Subsequently to his father's death he inherited the large estate of Downton, near Ludlow, from his grandfather, on which, after his return from Italy, he built a mansion, and he devoted much time to improving and ornamenting his grounds. In

1780 he was elected to serve in parliament for the borough of Leominster, and in the following parliament of 1784, for the borough of Ludlow, for which he continued to sit until the year 1806, when he retired from parliament. While a member of the House of Commons he acted with Mr. Fox, but he never took any part in debate, nor did he ever interest himself about politics. In 1814 he was appointed a trustee of the British Museum, as the representative of the Townley family.

Early in his life he commenced the formation of a collection of antiques and other works of art, to which his large fortune enabled him to make constant additions. It consisted principally of antient bronzes and Greek coins; and it was preserved in his London house in Soho Square, which contained a large room fitted up for the purpose. He bequeathed his collection (the value of which was estimated at 50,000*l.*) to the British Museum. He had originally intended to bequeath it to the Royal Academy. [British Museum, p. 453.] The bill legalizing the acceptance of this collection by the trustees of the British Museum received the royal assent on the 17th of June, 1824. Mr. Knight died in his house in London, on the 24th of April, 1824, and he was buried at Wormesley church, in Herefordshire, where there is a monument to his memory, with a Latin epitaph written by Dr. Cornwall, bishop of Worcester.

Mr. Payne Knight began at an early age to admire the remains of Grecian art; and hence in his studies of Greek literature his attention was mainly directed to those subjects which illustrate Greek sculptures and coins, viz. mythology, and the archaic Greek language. Accordingly his first work was 'An Account of the Remains of the Worship of Priapus lately existing at Isernia, in the kingdom of Naples: to which is added a Discourse on the Worship of Priapus, and its connexion with the Mystic Theology of the Antients,' 4to, 1786. (Distributed by the Dilettanti Society.) This illustration of the obscene worship of Priapus was severely censured by the author of the 'Pursuits of Literature;' but although it may be doubted whether the subject was worthy of investigation, it is certain that Mr. Knight had no other object in view than the purely scientific one of elucidating an obscure part of the Greek theology.

His next production was 'An Analytical Essay on the Greek Alphabet,' 4to., London, 1791. This work (which was reviewed by Porson in the 'Monthly Review' for 1794: see his article reprinted in Porson's 'Tracts,' p. 108, 'Museum Criticum,' vol. i., p. 489) was chiefly remarkable for an exposure of the forgery of certain Greek inscriptions which Fourmont professed to have found in Laconia. These inscriptions had deceived the most eminent scholars, among whom it is sufficient to name Winckelmann, Villoison, Valckenaer, and Heyne; and their genuineness was first questioned by Payne Knight, who supported his opinion with an elaborate argument. A feeble attempt has been subsequently made by Raoul Rochette to defend them; but their spuriousness is now universally admitted. (See Boeckh, *Corp. Inscript. Græc.*, vol. i., p. 61-104, whose dissertation has completely exhausted the subject.) Mr. Knight next attempted poetry, for which the character of his mind did not at all fit him. In 1794 he published the 'Landscape,' a didactic poem, in three books, addressed to Uvedale Price, Esq. This poem contains many precepts, marked by sound judgment and good taste, on the subject to which it relates; and at the end are some sagacious remarks on the French Revolution, the event of which was still undetermined. It appears from the preface to Mr. Price's 'Essay on the Picturesque' (published in 1794), that Mr. Knight proposed to Mr. Price that the papers written by the latter on rural improvement should be published with his poem of the 'Landscape,' in the same manner as Sir J. Reynolds's notes were published with Mr. Mason's 'Du Fresnoy;' but that the proposal came too late to enable Mr. Price to accept it. Mr. Knight published three other metrical works at subsequent periods of his life. The first was a didactic poem, in six books, entitled 'The Progress of Civil Society,' 4to., London, 1796, now only known by the witty parody in the 'Antijacobin' (supposed to have been written by Mr. Canning). The second was 'A Monody on the Death of the Right Honourable C. J. Fox,' 8vo., London, 1806-7. The third was entitled 'Alfred, a Romance in rhyme,' 8vo., London, 1823.

In 1805 Mr. Payne Knight published 'An Analytical Enquiry into the Principles of Taste,' 8vo., London, which passed through several editions. This work is characterized by originality and acuteness of thought, and is the only production of Mr. Knight's which is interesting to the general reader. It was reviewed with some severity in the 'Edinburgh Review' for January, 1806. (See also some remarks on it in Mackintosh's 'Life,' vol. i., p. 371.) Mr. Knight afterwards contributed to the 'Edinburgh Review' (Number for July, 1809) a critique of Falconer's 'Strabo,' a work published at the Clarendon Press. In the following year Mr. Copleston, then a tutor of Oriel College, Oxford, and now bishop of Llandaff, published a defence of the University of Oxford against the strictures of the 'Edinburgh Review.' This defence related not only to Mr Knight's critique of Falconer's 'Strabo,' but also to passages in other articles ascribed to Mr. Playfair and Mr. Sydney Smith. An article in reply, contributed by the three reviewers, appeared in the 'Edinburgh Review' for April, 1810: Mr. Knight's share of it extends from p. 169 to p. 177. Mr. Copleston afterwards rejoined, and the controversy with Mr. Knight ended in a grammatical discussion totally foreign to the question at issue. Mr. Knight erred in making the University of Oxford responsible for the defects of a work published at the Clarendon Press; but he was unquestionably right in representing classical literature as being at a low ebb in Oxford at that time. In 1809 were published 'Specimens of Antient Sculpture, selected from different Collections of Great Britain, by the Society of Dilettanti,' fol., and a second volume was published in 1835. This magnificent work was chiefly due to Mr. Knight's industry and taste; the subjects were chosen by him, and he wrote the prefaces and descriptions of the plates.

In 1816 Mr. Knight was examined by a select committee of the House of Commons on the Elgin Marbles. The evidence which he gave upon this occasion was not marked with his usual good taste as to the merits of the remains of Greek art: an examination of it, written in a hostile spirit, may be seen in the 'Quarterly Review,' vol. xiv., pp. 533-543. See also a political squib reprinted in the 'Whig Guide.' Mr. Knight distributed a short Answer to the 'Quarterly Review' among his literary friends in explanation of the parts of his evidence which he considered had been misrepresented.

In 1820 Mr. Knight published an edition of the Iliad and Odyssey, with prolegomena. His object in this edition was to restore the text of Homer to its original state. He rejected the Wolfian hypothesis concerning the origin of the Homeric poems, and supposed the Iliad and Odyssey to have been each the work of a single poet; the poet of the Odyssey being posterior to the poet of the Iliad. The process by which he attempted to restore the text of these two poems to their original state was twofold: 1. The remodelling of the language, by the introduction of forms disused in later times, and of the antient letter styled the *digamma*. 2. The rejection of verses interpolated by later rhapsodists and poets. Many forms are restored, and many verses are rejected, on exceedingly doubtful and merely conjectural grounds: and indeed the subject is one which does not in general admit of any close approach to certainty. The work however bears marks of considerable acuteness and originality of thought, and it furnishes much assistance towards conceiving the earliest form of the Greek language. A superficial notice of this work is contained in the 'Quarterly Review' for April, 1822, in an article said to have been written by Ugo Foscolo. After Mr. Knight's death his catalogue of his coins was published by the trustees of the British Museum. (*Nummi Veteres, &c.*, 4to., Lond., 1830.) A notice of this publication may be seen in the 'Philological Museum,' vol. i., pp. 122-5. Besides the works above mentioned, Mr. Knight wrote several papers in the 'Classical Journal' and the 'Archæologia' (see vols. xv. 393, xvii. 220, xix. 369): the article on the works and life of Barry, in the 'Edinburgh Review' for August, 1810, is also by him. To these may be added a paper on the Homeric Palace, published after his death in the 'Philological Museum,' vol. ii., pp. 645-9. He likewise first published the celebrated Elean Inscription, concerning which see Boeckh, 'Corp. Inscript. Gr.,' No. 11.

KNIGHT, THOMAS ANDREW, brother of the subject of the preceding article, was born on the 10th of October, 1758. The grandfather of these eminent men had amassed a large fortune as an ironmaster at a period long before steam machinery was introduced in the smelting and ma-

nufacture of iron, and when those works were necessarily situated on the banks of running streams. One of his principal forges was at Downton on the river Teme, a little below the site of the noble mansion afterwards erected by Mr. Payne Knight, and where malleable iron of superior quality was manufactured, its locality being particularly favourable for a supply of charcoal.

When young, Mr. Knight's education was so much neglected, that when, at the age of nine years, he was sent to school at Ludlow, he was scarcely able to do more than read. But the days of his childhood had not been passed without employment. He had a great turn for the observation of natural phenomena, and having been left to occupy himself in the country in what way he pleased, he had already formed a close practical acquaintance with such plants and animals as Herefordshire could furnish. Eventually he graduated at Baliol College, Oxford, and subsequently occupied himself with researches into various points of vegetable and animal physiology. One of the most remarkable of his early investigations was contained in a paper read before the Royal Society in 1795, upon the inheritance of disease among fruit-trees, and upon the propagation of debility by grafting. The county of Hereford had long been celebrated for the produce of its orchards, and the cider made therefrom was in high esteem; but towards the latter part of the last century the trees of the most esteemed sorts, which had been eulogized by the county poet, Philips, became gradually less productive, their vitality being nearly exhausted. Still the old practice of grafting young stocks with the debilitated shoots of these trees generally prevailed, till Mr. Knight, after a long course of interesting experiments, satisfied himself that there is no renewal of vitality by the process of grafting, but merely a continuation of declining life, and that young grafted stocks soon became as much diseased as the old parent trees. He then commenced a course of experiments by fertilising the blossoms of some hardy crabs or apples with the pollen taken from the flowers of the most celebrated dessert and cider fruits, and sowing the seeds thus artificially impregnated. From that time Mr Knight was looked up to in this country as a vegetable physiologist of a high order; a character which he ably sustained by various experimental researches into vegetable fecundation, the ascent and descent of sap in trees, the phenomena of germination, the influence of light upon leaves and a variety of similar subjects. In 1797 he published a small work called 'A Treatise on the Culture of the Apple and Pear, and on the Manufacture of Cider and Perry;' in which he recommends raising new kinds from seed, and suiting the sorts produced to the peculiarities of soil and climate, which are found to have so great an influence on the quality of cider. Mr. Knight did not confine his experiments to the improvement of the apple only, but he raised many pears most valuable for the dessert, and so hardy as not to require the warmth and shelter of walls, and consequently capable of being cultivated by every farmer and cottager in the country. His seedling plums, strawberries, nectarines, and potatoes are also of great value, and an important addition to the luxuries and necessaries of life.

The great object of this distinguished man seems to have been in all cases utility. It was chiefly to questions which he thought likely to lead to important practical results that his attention was directed, and the numerous papers communicated by him to the Transactions of the Horticultural Society, in the chair of which he succeeded his friend Sir Joseph Banks, have all this distinguishing feature. No one who has traced the progress of horticultural skill for the last twenty or thirty years can be ignorant that it is mainly due to the writings and practice of Mr. Knight; he was probably the best practical gardener of his day. It is however not a little remarkable that with so very extensive a knowledge of the facts of vegetable physiology, he should have been so unfortunate as he certainly was in many of his explanations of them. This arose no doubt from his unacquaintance with vegetable anatomy, and consequently with the minute means by which Nature brings about her results in organised matter. Mr. Knight's experiments were not confined to vegetable physiology. He was a close observer of the habits of animals, and one of his last communications to the Royal Society was on the subject of animal instinct. At a late period of his life he also made some attempts to improve the breed of draught horses, by crossing the large London dray-horse with the strong and compact Norwegian mare, the result of which was not ascertained at the time of his death, but was expected, from the appearance of the colts, to be attended with success. He died in London on the 11th of May, 1838, in the 80th year of his age.

KNIGHTON, HENRY, an English historian of the close of the fourteenth and beginning of the fifteenth century, was a canon-regular of Leicester abbey. The time neither of his birth nor death is known. His 'Compilatio de Eventibus Angliæ, à tempore Regis Edgari usque mortem Regis Ricardi Secundi,' was published by Twysden in the 'Decem Scriptores,' fol., London, 1652, col. 2311-2741 (Selden's notice of him, prefixed to the *Decem Scriptores*, pp. 46, 47; Tanner, *Bibl. Brit. Hib.*, p. 458.)

KNISTENEAUX. [ALGONQUINS.]

KNOT. [SCOLOPACIDÆ.]

KNOX, JOHN, the son of obscure parents, was born in 1505: there is some doubt respecting his birth-place, which was probably the village of Gifford in East Lothian, although it has been asserted that he was born at Haddington. His education was more liberal than was then common. In his youth he was put to the grammar school at Haddington, and about 1524 removed to the University of St. Andrew's, where the learning principally taught was the philosophy of Aristotle, scholastic theology, civil and canon law, and the Latin language; Greek and Hebrew were at that time little understood in Scotland, and Knox did not acquire the knowledge of them until somewhat later in his life. 'After he was created Master of Arts he taught philosophy, most probably as an assistant or private lecturer in the university, and his class became celebrated.' 'He was ordained a priest before he reached the age fixed by the canons of the church, which must have taken place previous to the year 1530, at which time he had attained his 25th year, the canonical age for receiving ordination.' (M'Crie's *Life*, vol. i., p. 12.) His first instruction in theology was received from John Major, the professor of theology in the university, but the opinions founded upon it were not long retained; the writings of Jerome and Augustin attracted his attention, and the examination of them led to a complete revolution in his sentiments. It was about the year 1535 that his secession from Roman Catholic doctrines and discipline commenced, but he did not declare himself a Protestant until 1542.

The Reformed doctrines had made considerable progress in Scotland before this time. Knox was not the first reformer, there were many persons, 'earls, barons, gentlemen, honest burgesses, and craftsmen,' who already professed the new creed though they durst not avow it: it was to the avowal, extension, and establishment of the Reformed religion that his zeal and knowledge so powerfully contributed. His reprehension of the prevalent corruptions made him regarded as a heretic, for which reason he could not safely remain in St. Andrew's, which was wholly in the power of Cardinal Beaton, a determined supporter of the church of Rome, and he retired to the south of Scotland, where he avowed his apostacy. He was condemned as a heretic, degraded from the priesthood, and it is said by Beza that Beaton employed assassins to waylay him. He now for a time frequented the preaching of the Reformed teachers, Williams and Wishart, who gave additional strength to opinions already pretty firmly rooted; and having relinquished all thoughts of officiating in the Roman Catholic church, he became tutor to the sons of Hugh Douglas of Langniddrie, a gentleman of East Lothian, who had embraced the Reformed doctrines. After the murder of Cardinal Beaton, Knox removed with his pupils from Langniddrie to St. Andrew's (1547), where he conducted their education in his accustomed manner, catechising and reading to them in the church belonging to the city. There were many hearers of these instructions, who urged him and finally called upon him to become a public preacher. Diffident and reluctant at first, upon consideration he consented to their request. In his preaching, far more than the reformed teachers who had preceded him, he struck at the very foundations of popery, and challenged his opponents to argument, to be delivered either in writing or from the pulpit, and so successful were his labours that many of the inhabitants were converted to his doctrines.

It was not long before an event took place by which his efforts received a temporary check. The murder of Cardinal Beaton had given great offence, and created great excitement through the kingdom. It was a severe blow to the

Roman Catholic religion and the French interest in Scotland, both of which he had zealously supported, and vengeance was loudly called for upon the conspirators by whom he had been murdered. These conspirators had fortified St. Andrew's, and the art of attacking fortified places was then so imperfectly understood in Scotland that for five months they resisted the efforts of Arran, the Regent. From their long wars in Italy and Germany, the French had become as experienced in the conduct of sieges as the Scotch were ignorant. The French were allies of Scotland; to France therefore Arran sent for assistance. About the end of June, 1547, a French fleet, with a considerable body of land forces, appeared before the town. (Robertson, vol. i., 314.) The garrison capitulated, and Knox, among many others, was taken prisoner, and conveyed to Rouen, where he was confined on board the galleys. After nineteen months' close imprisonment he was liberated, with his health greatly injured by the rigour with which he had been treated (1549). Knox now repaired to England, and though he had never received ordination as a Protestant, Cranmer did not hesitate to send him from London to preach in Berwick. In Berwick and the North of England he followed his arduous undertaking of conversion until 1551, when he was made one of King Edward's chaplains, with a salary of 40*l.* a year. While his friends in the English administration offered him further preferment, which he declined, his enemies brought charges against him before the council, of which he was soon afterwards acquitted. He was in London at the time of Edward's death, but thought it prudent to fly the kingdom as soon as Mary's policy towards the Protestants became apparent. In January, 1554, he landed at Dieppe; from Dieppe he went to Geneva; and from Geneva to Frankfort, where Calvin requested him to take charge of a congregation of English refugees. In consequence of some disputes he returned from Frankfort to Geneva, and, after a few months' residence there, to Scotland, where he again zealously promulgated his doctrines. The English congregation at Geneva having appointed him their preacher, he thought right to make another journey to the Continent (1556), which he quitted finally in 1559. During these the quietest years of his life he published 'The First Blast of the Trumpet against the monstrous Regiment of Women,' in which he vehemently attacked the admission of females to the government of nations. Its first sentence runs thus: 'To promote a woman to bear rule, superiority, dominion, or empire, above any realm, nation, or city, is repugnant to nature, contumely to God, a thing most contrarious to his revealed will and approved ordinance, and finally it is the subversion of all equity and justice.' This inflammatory composition, as might have been expected, excited fresh hostility against its author. At the time of its publication both England and Scotland were governed by females; Mary of Guise, the queen-dowager of Scotland, was likewise regent of that kingdom, while the Princess Mary was heiress of its throne: and in England Mary was queen, and her sister Elizabeth the next in succession to the crown. It hardly admits of wonder then that when, in 1559, Knox was desirous of returning to England, Queen Elizabeth's ministers would not permit him to do so, and he was compelled to land at Leith.

The Protestants in Scotland were by this time nearly equal to the Roman Catholics, both in power and in number; but their condition had lately been changed somewhat for the worse. The queen regent, who from motives of policy had found it desirable to conciliate and uphold them, from similar motives had become their opponent and oppressor; and many of the preachers of the 'Congregation' (the name by which the body of Protestants was then called) were summoned for various causes to take their trial. It was on a day not long previous to these trials that Knox returned to his country to resume the labours of his ministry· hearing of the condition of his associates, 'he hurried instantly (says Robertson, i. 375) to Perth, to share with his brethren in the common danger, or to assist them in the common cause. While their minds were in that ferment which the queen's perfidiousness (she had broken a promise to stop the trial) and their own danger occasioned, he mounted the pulpit, and, by a vehement harangue against idolatry, inflamed the multitude with the utmost rage.' The indiscretion of a priest, who, immediately after Knox's sermon, was preparing to celebrate mass, caused a violent tumult. The churches in the city were broken open, altars were overturned, pictures defaced, images destroyed, and the monasteries levelled with the ground. The insurrection, which was not the effect of any concert or previous deliberation, was censured by the Reformed preachers; and it affixes no blame to the character of Knox. The queen regent sent troops to quell this rebellion; troops were also raised by the Protestants, but a treaty was entered into before any blood was shed.

The promotion of the Reformation in his own country was now Knox's sole object; he was reinstated in his pulpit at St. Andrew's, and preached there in his usual rough, vehement, zealous, and powerful manner, until the Lords of the Congregation took possession of Edinburgh, where he was immediately chosen minister. His efforts gave great offence and alarm to the Roman Catholic clergy, especially during a circuit that he made of Scotland. Armies were maintained and sent into the field by both parties, for treaties were no sooner made than they were violated; French troops again came to succour the Roman Catholic clergy; and to oppose them Knox entered into correspondence with Cecil, and obtained for his party the assistance of some forces from England. The 'Congregation' however had many difficulties and disasters to struggle with. A messenger whom they had sent to receive a remittance of money from the English was intercepted and rifled; their soldiers mutinied for want of pay, their numbers decreased, and their arms were unsuccessful. Under these circumstances it required all the zeal and the courage of Knox to sustain the animation of his dispirited colleagues; his addresses from the pulpit were continual and persevering. As the treaty by which the civil war was concluded made no settlement in religion, the reformers found no fresh obstacle to the continuance of their efforts; and Knox resumed his office of minister in Edinburgh. In this year (1560) the queen regent died, and in the following Queen Mary took possession of the throne of Scotland; her religious opinions were Roman Catholic, but she employed Protestant counsellors. The preaching of Knox and his denunciations of her religious practice attracted her attention. At different times he had interviews with her (which at first gave rise to much speculation), but neither her artifices produced much effect, nor his arguments; so stern was he, and so rough in his rebukes, that he once drove her into tears. At her instigation Knox was accused of treason, and was tried, but the whole convention of counsellors, excepting the immediate dependants of the court, pronounced that he had not been guilty of any breach of the laws (1563).

Knox continued his exertions, with difficulties of different kinds constantly besetting him. At one time he was prohibited from preaching, at another he was refused entrance into Edinburgh after a temporary absence, but on the whole his influence was little impaired, and his opposition to popery successful. His health however was affected by continual exertion: in 1570 he was struck with apoplexy, from which he so far recovered as to renew his labours for more than a year; but in 1572 his exhausted constitution gave way, and he died on the 24th of November. He was buried in Edinburgh, in the church then called St. Giles's, now the Old Church.

Knox was twice married; first in 1553, to Marjory, daughter of Sir Robert Bowes; afterwards, in 1564, to Margaret Stewart, daughter of Lord Ochiltree; he had sons only by his first marriage; they all died without issue. He had three daughters by his second wife; the youngest, Mrs. Welch, appears to have been a remarkable person.

The doctrines of Knox were those of the English reformers impregnated to a certain extent with Calvinism. His opinions respecting the sacraments coincided with those of the English Protestants: he preached that all sacrifices which men offered for sin were blasphemous; that it was incumbent to make an open profession of the doctrine of Christ, and to avoid idolatry, superstition, and every way of worship unauthorized by the Scriptures; he was altogether opposed to Episcopacy. His views were more austere than those promulgated in England; and it would be curious to trace in what degree the present greater severity of the Scotch Presbyterians, compared with that of the English Protestants, is attributable to this reformer.

The opposition of Knox as well to Episcopacy as to Papacy has caused his reputation to be severely dealt with by many writers of contrary opinions on these points. A most elaborate character of him has been drawn at some length by

Dr. M'Crie, and though it may perhaps be well to inform the reader that Dr. M'Crie was a rigid Presbyterian, we think it on the whole a just representation. We subjoin a brief summary of it: Knox possessed strong talents; was inquisitive, ardent, acute, vigorous, and bold in his conceptions. He was a stranger to none of the branches of learning cultivated in that age by persons of his profession, and he felt an irresistible desire to impart his knowledge to others. Intrepidity, independence, and elevation of mind, indefatigable activity, and constancy which no disappointments could shake, eminently qualified him for the post which he occupied. In private life he was loved and revered by his friends and domestics: when free from depression of spirits, the result of ill health, he was accustomed to unbend his mind, and was often witty and humorous. Most of his faults may be traced to his natural temperament and the character of the age and country in which he lived. His passions were strong, and as he felt he expressed himself without reserve or disguise. His zeal made him intemperate: he was obstinate, austere, stern, and vehement. These defects, which would have been inexcusable in most other persons, may be more easily forgiven in him, for they were among the most successful weapons in his warfare.

(M'Crie's *Life of Knox; Reviews of* M'Crie's *Life of Knox*, in the *British Critic of* 1813, in the *Edinburgh Review*, vol. xx., p. 1, and in the *Quarterly Review*, vol. ix., p. 418; Robertson's *History of Scotland;* Bayle's *Dictionary*, &c.)

KNUTSFORD. [CHESHIRE.]

KOALA. [MARSUPIALIA.]

KOBA. [ANTELOPE, vol. ii., p. 79.]

KOKAN. [TURKISTAN.]

KONG MOUNTAINS, THE, are situated in the western parts of Northern Africa. Mungo Park, in his first journey, saw from a distance an elevated range between 3° and 4° W. long. and about 11° N. lat., and was told that it was called Kong, which in the Mandingo language signifies mountains. This elevated range, whose direction, length, width, and position, are otherwise unknown, seems to be the principal chain of the extensive mountain-system which, with its offsets, extends from east to west over the whole country lying between the most eastern bend of the Quorra river (7° E. long.) and the coast of Sierra Leone (13° W. long.), and from south to north reaches from the coast of Guinea (about 5° N. lat.) to the very borders of the Sahara (about 16° N. lat.). The width of this extensive mountain-system between 13° W. long. and 0° seems to be about 800 miles, but to the east of the meridian of Greenwich it grows narrower, and in the bend of the Quorra it hardly exceeds 70 or 80 miles. The whole system covers an area of much more than 800,000 square miles, and is divided from the elevated table-land of Southern Africa by the valley of the Quorra, which between 7° and 8° E. long. is comparatively narrow, so that in this part the two elevated mountain-systems approach close to another. Very little is known respecting the elevation of any part of it. Clapperton and the Landers, who traversed the most eastern offset in their journey from Badagry to Katunga, crossed a range about 2500 feet above the sea. The Kong Mountains seen by Mungo Park however must attain a much higher elevation, as they are seen from a great distance. According to the information obtained by Mollien from the natives, mountains occur between 7° and 10° W. long. and 8° and 9° N. lat., which are covered with snow all the year round. But Caillié, who traversed them from west to east, near 10° N. lat., did not observe snow on the mountains; he found that the moderate ridges which lay in his way were separated from one another by fertile, well watered, and extensive plains, and that the valleys were not numerous, and comparatively short. Mungo Park, who on his return from Sego traversed the mountain-region from east to west between 12° and 13° N. lat., seems to have travelled not far from a more elevated tract situated to the south of his route. He went over a succession of elevated ridges and deep but generally wide valleys, the water-courses of which were branches of the Senegal, and ran off to the northward, until he came to a rocky and woody desert, the Jallonkadoo Wilderness, which the caffila was four days in traversing. This elevated tract constitutes the watershed between the streams which run into the Senegal and Gambia, and is the western extremity of the high land which in this part traverses the mountain-region from east to west. Having passed it, Mungo Park found that the rivers ran southward into the Gambia. As the mountains, and the plains and valleys enclosed by them, have the advantage of abundant rains during the season when the sun is in the northern hemisphere, they are everywhere covered with high trees and luxuriant vegetation where the ground has not been cleared for cultivation; but the botanical products of this tract have not been examined by a naturalist. It seems to abound in metallic wealth, at least it is known that gold is found in almost every part, and iron-ore occurs in numerous places. The native tribes, especially the Mandingos and Foulahs, collect large quantities of gold-dust, and know how to turn the iron-ore to advantage.

(Mungo Park's (*First*) *Travels into the Interior of Africa*, Mollien's *Travels in Africa;* Clapperton's and Lander's *Travels in Africa;* and Caillié's *Travels through Central Africa.*)

KÖNIGSBERG is one of the two governments which constitute the province of East Prussia, and is part of the antient kingdom of that name, which is now divided into East and West Prussia. It is the most north-easterly part of the Prussian dominions, and is bounded on the north by the Baltic, on the north-east by Russia, on the east by the government of Gumbinnen, on the south by Poland, and on the west by the governments of Marienwerder and Danzig. Its area is 8627 square miles, including the large bay called the Frische Haff, and the population at the end of 1837 was 746,462, of whom 3943 were Jews. The government is divided into 20 circles. [PRUSSIA, EAST.]

KÖNIGSBERG, the capital of the two provinces of East and West Prussia, and the second city in the Prussian dominions, lies in 54° 42′ 12″ N. lat. and 20° 29′ 15″ E. long. It is situated on the navigable river Pregel, which falls into the Frische Haff about four miles below the city. The river, which runs from east to west, approaches the city in two arms, which uniting form an island. Königsberg is built on both sides of the river, and on the island. It consists of three parts, called the Old Town, Löbenicht, and the Kneiphof, besides the royal palace and the citadel Fredericksberg, and four large suburbs and ten smaller ones called Liberties. The Old Town and Löbenicht, both of which are on the north side of the river, are built on seven hills, and the Kneiphof on the island, the soil of which is swampy, and the houses are erected on piles.

The origin of Königsberg was in the thirteenth century, when Ottokar, king of Bohemia, and other princes, having, by the command of the pope, assisted the knights of the Teutonic order in conquering the province of Samland in 1254, advised the knights to build a fort on the eminence, near the Pregel, where the palace now stands. Accordingly they erected a wooden fort in 1255, and in 1257 another fort of stone, surrounded with double walls, nine towers, and a moat. The infant town was plundered and burned in 1264, and the inhabitants who escaped death or slavery settled in the valley between the palace and the river. This was the origin of the present Old Town. In 1300 the Löbenicht, till then a village, obtained the privilege of a town, and in 1327 the Kneiphof was founded. Thus Königsberg consisted originally of three towns, each of which had its own magistrates and jurisdiction. The suburbs were gradually added, and the city became one of the most important commercial places of the north. In 1365 it joined the Hanseatic League, and in 1457, when Marienberg was betrayed to the Poles, Königsberg was chosen for the residence of the grand master of the Teutonic order, and so remained till Prussia was transformed into a duchy in 1528, some time previous to which the Reformation had made great progress in that province. In 1657 Prussia was ceded by the peace of Wehlau to the elector of Brandenburg, who built the citadel to overawe the citizens. In 1701 Frederick III. was crowned here as the first king of Prussia. In the Seven Years' War Königsberg was occupied from 1758 to 1764 by the Russians, who governed the country in the name of the Empress Elizabeth; and it again suffered severely from the exactions of the French, who occupied it in 1807, after the disastrous battle of Friedland, and imposed heavy contributions. It was again visited by the French in the Russian campaign, large bodies of whom passed through it after their defeat.

The impression, says Preuss, which the interior of the city makes on a stranger cannot be called favourable, not-

withstanding the scene of busy life which it presents, on account of the want of regularity in the place, and the mean appearance of the streets, which are generally narrow and often crooked: the few handsome public and private edifices are scattered over the whole city. There are seven wooden bridges over the Pregel. The castle, or royal palace, originally built, as we have said, in 1255, has been gradually altered, enlarged, and beautified till it has obtained its present form. The most interesting parts of it are the church, the Muscovite hall 274 feet long and 59 wide, without pillars, and the tower 240 feet high (278 above the Pregel), from the top of which there is a fine prospect of the city and environs. The most remarkable building is the cathedral, founded in 1332. It has a fine organ with 5000 pipes, many excellent paintings by Lucas Cranach and others; the Wallemodt Library, in which are several autograph letters from Luther to Catherine Bora, and the original of the summons and the safe conduct which Luther received to appear at the diet at Worms. Among the numerous public institutions is the university, founded by Duke Albert in 1544. It has now 27 ordinary and 11 extraordinary professors, and 18 private lecturers, in all 56, and about 450 students. With the university are combined the most important scientific institutions, such as a theological seminary (in two divisions), one philological, one historical, one homiletic, one Polish, one Lithuanian seminary, a library of 6000 volumes, a botanic garden (founded in 1809, with between 5000 and 6000 species of plants), and an observatory, which has of late years attained great celebrity from the astronomical observations of Professor Bessel. There are likewise three gymnasia, and very numerous schools, with many charitable institutions. Königsberg has many manufactories, but not on an extensive scale, of woollen, linen, silk, cloth, leather, tobacco, and sugar; it has celebrated breweries and brandy distilleries, &c. Its geographical position has long made it an important place of trade. Its most flourishing period was from 1783 to 1789, when nearly 2000 ships arrived and as many left the port every year. Its most unfortunate period was between 1823 and 1826, when the number of arrivals and departures was less than 300 in a year. Its commerce has since revived a little. The chief trade is in corn; beer, flax, hemp, tallow and wax, bristles, and quills are likewise exported. Königsberg, according to the census of 1837, contained 64,200 inhabitants.

KOOBA. [Georgia, p. 176.]

KOODOO. [Antelope, vol. ii., p 78.]

KOOM. [Persia.]

KORAN. [Mohammed.]

KORAY, ADEIMANTOS, born at Smyrna in 1748, of a family from Chios, studied first at Smyrna, and afterwards at Montpellier, where he took his degree as doctor of medicine, and settled in France. He wrote several works on medicine, and published French translations of the treatise of Hippocrates 'On Air, Water, and Situation,' with copious notes, and of the 'Characters' of Theophrastus. In 1801 he translated into modern Greek Beccaria's treatise 'On Crimes and Punishments,' which he dedicated to the then newly constituted republic of the Ionian Islands. He afterwards wrote in French a memoir, 'De l'Etat Actuel de la Civilization en Grèce,' 1803, which, being translated into modern Greek, answered the double purpose of making the people of Western Europe acquainted with the moral and intellectual condition of his countrymen, and of making the Greeks acquainted with it themselves. Koray also undertook to edit a series of antient Greek writers, under the title of the 'Hellenic Library.' He began with the 'Orations of Isocrates,' 2 vols. 8vo., Paris, 1807, which he accompanied with interesting prolegomena and explanatory notes. He afterwards edited in succession the 'Lives of Plutarch,' the 'Histories of Ælian,' the fragments of Heraclides and of Nicolaus Damascenus, the fables of Æsop, Strabo, the first four books of the Iliad, and the 'Politic of Aristotle.' The reputation of Koray attracted many young Greeks to him, who profited by his conversation and instruction. Although long absent from his native country he felt to the last the most lively interest in her fate. He foresaw that a struggle was approaching, and he wished the minds of the Greeks to be prepared for it. He encouraged particularly the diffusion of education, the formation of new schools in Greece, and he furnished directions for the method and course of studies. He also contributed to fix the rules and orthography of the modern Greek, in which he took a middle path between the system of Neophytus Doukas, which Koray stigmatized with the name of 'macaronic,' and that of Christopoulos, which affected to write the modern Greek exactly as it is spoken. Koray wished to purify the language by discarding the numerous Italianisms, Gallicisms, and Germanisms, which had been introduced into it, and by substituting old Greek words, at the same time avoiding the affectation of too great a purism or classic pedantry. (Rizo, *Cours de Littérature Grecque Moderne*, 1827.)

Koray died at Paris a few years ago, having had the satisfaction of seeing the struggle in which his countrymen had engaged rewarded by success.

KORDOFAN, or KORDUFAN, a country in the north-eastern parts of Africa, south of Nubia, extends from about 15° 20′ to 10° N. lat., and from 28° to 32° E. long. It is divided from Dar-fur, which lies to the west, and from Nubia, which lies farther north, by deserts, in which water occurs only at a few places, and not in all seasons. On the east it extends to the Bahr el Abiad, or western branch of the Nile, which divides it from Sennaar. Its southern boundary-line is unknown, and stated to be formed by extensive forests covering the northern declivity of the Deir or Tuggala Mountains, and inhabited by negroes.

The southern districts, as far north as 12° N. lat., have a broken surface, and the hills rise in some parts to a considerable height. This seems to be the best part of the country, as it contains many springs and wells, which always yield an abundance of drinkable water. Gold-dust also is collected in several places; and iron-ore is abundant and is worked. The country north of 12° N. lat. may be considered as an elevated and mostly level plain, on which several isolated groups of hills rise at considerable distances from one another. These hills are the only places which are inhabited, because it is only in their neighbourhood that wells are found which yield water all the year round. Certain wandering tribes visit some depressions in the plain, where, in the rainy season, temporary lakes are formed, which preserve the water during the greater part of the year. The plain itself is partly covered with grass and partly with low thorny bushes; in a few places forest trees occur, among which is the baobab, or Adansonia. In the rainy season, which lasts from April to September, the plain is partly covered with water, and affords pasture for numerous herds of cattle. In the dry season it is changed into a desert. No river traverses this country, with the exception of the Bahr el Abiad, which constitutes its eastern boundary.

Agriculture does not extend beyond the neighbourhood of the inhabited places. The principal objects of cultivation are two kinds of millet, called durrha and doghen, and of simsim or sessamum. In a few places wheat and barley are grown. The wandering tribes of the Beduin Arabs have herds of cattle, horses, and camels. The horses are of an excellent breed, and the cattle have a hunch of fat. The tribes of negroes inhabiting the southern hilly country keep a great number of cattle, sheep, and goats, but few camels and horses. Among the wild animals Rüppell mentions elephants, giraffes, and several kinds of antelopes.

Kordofan is inhabited by three races of men: the negroes, or Nuba; the Dongolawi, or settlers from Dongola; and the Beduin Arabs. The first, who may be considered as the native inhabitants, are exclusively in possession of the southern hilly country, but a great number of them are settled on the plain, where they are agriculturists. The Dongolawi are merchants, and settled in those places where the caravans pass. They have introduced horticulture and artificial irrigation into Kordofan; and their orchards contain date-trees. The different tribes of the Beduin Arabs wander about in the plain; they cultivate however a good deal of doghen for their own consumption. They are known under the name of Bakara Arabs.

Kordofan was subject to the sovereign of Sennaar up to the beginning of the present century. It was then taken from him by the king of Dar-fur, in whose possession it remained to the year 1820, when it was conquered by the arms of Mehemet Ali, Pasha of Egypt. At the time when the country was under the king of Dar-fur, Obeid, its capital, was a considerable town, and regular caravans resorted to it for slaves, ivory, gold-dust, gum arabic, ostrich feathers, tamarinds, and honey. But on the occupation of the Egyptian Turks the town was destroyed, and Rüppell

estimates its population at about 5000 inhabitants. He mentions a place, Shaban, which is a kind of entrepôt for the caravans which traverse Eastern Sudan from east to west, and connect it with Sennaar and Habesh. Two roads lead from Sennaar to Obeid, two others from the last-mentioned place to Dabbe in Dongola, and three to Cobbe in Dar-fur.

(Rüppell's *Reisen in Nubien, Kordofan, und dem Petraischen Arabien.*)

KÖRNER, THEODOR, was born at Dresden in the year 1791, of respectable parents. The weakness of his health prevented any great application to study, and as a child he was rather remarked for the amiability of his disposition than for any intellectual acquirements. However, as he grew, both his mind and body gained strength, and he showed an early inclination to history, mathematics, and physical science. Above all he loved poetry, and was encouraged in his juvenile compositions by his father, who was an ardent admirer of the works of Göthe and Schiller. Being educated at a school in Dresden, and by private teachers, he did not leave his father's house till he was near seventeen, when, being designed to fill some office in the mines, he was sent to the Bergacademie* at Freiberg, where he made great progress. After completing the necessary course of study, he went to the university at Leipzig, and afterwards to Berlin. A fit of illness however, and the dislike which his father had to the wild spirit then reigning among German students, were the cause of his being sent to Vienna, where he laboured much at poetical composition. Two pieces, 'Die Braut' (The Bride), and 'Der grüne Domino' (The Green Domino), were acted at the theatre in 1812, and meeting with success were followed by others, of which 'Zriny' and 'Rosamunde' (the English Fair Rosamond), two tragedies, were works aiming at a high character.

The events of the year 1813 made a deep impression on Körner. Inspired by patriotic zeal, he resolved to engage in the cause of Prussia against the French, and joined the volunteer corps under Major Lützow. He was wounded by two sabre cuts at the battle of Kitzen, and lay concealed and disabled in a wood, whither his horse had carried him, until he was removed by two peasants, sent by his comrades, to a place of safety. In a subsequent battle, fought on the 26th August, on the road from Gadebusch to Schwerin, he was killed by a shot, and buried by his comrades at the foot of an oak on the road from Lübelow to Dreikrug, with all marks of honour, and his name was cut on the bark of the tree.

As Körner was scarcely twenty-two years of age at the time of his death, his works, which are rather numerous, must be judged with lenity. To comprehend the great impression which his patriotic poems made, it is necessary for the reader to throw himself back to the time, and enter into the deep-rooted hatred felt by the Prussians for the French. His fame chiefly rests on a collection of lyrical pieces called 'Leier und Schwert' (Lyre and Sword), many of which were written in the camp, and which can now only be properly felt and appreciated when studied in connection with the events that occasioned their composition, and with a full understanding of the sincerity of the poet's character. In fact, this very stamp of sincerity is the chief beauty of his works: they contain no new thoughts or striking creations of imagination, but are pervaded by only one sentiment, the glory of fighting and dying for 'fatherland,' expressed in a variety of shapes. When an attempt is made at more elaborate composition, the sentiment is rather encumbered than otherwise, as the impulse of feeling is less obvious. Körner evidently had a perception of the higher poetical beauties; but his best poems are those which seem the mere unpolished effusions of the moment, and exhibit the feeling quite unadorned. Such is his spirited song 'Männer und Buben' (Men and Cowards). The happiest effort of imagination is his 'Schwert-lied' (Sword-song), in which the sword becomes a person and addresses its owner; a piece which has been translated (not very closely) by Lord F. L. Gower.

Had his life been of longer duration, it is doubtful if he would have attained any great eminence as a dramatist. There are deeper thoughts in his dramas than in his 'Leier und Schwert;' some scenes are extremely powerful, and here and there a character, as for instance Solyman the Great in 'Zriny,' is boldly drawn. He also evinces a knowledge of that distribution of incidents which constitutes dramatic construction, but he has unfortunately two great faults of the most opposite character: on the one hand, he perpetually interrupts the action of his play by long speeches, which merely describe historical circumstances or psychological phenomena unconnected with the subject; and on the other, he has an inordinate taste for melodramatic situations and catastrophes. If the former fault had increased he would have been no dramatist at all; if the latter, he would have been a mere playwright. A complete edition of his works, in one volume, was published at Berlin in 1835.

* A Bergacademie is an institution where the principles and practice of mining are taught.

KOSCIUSKO, THADDEUS, born in 1756, of a noble but not wealthy family of Lithuania, after studying first at Warsaw, and afterwards at Paris, for the military profession, was made a captain in the Polish army. He afterwards returned to Paris, and volunteered to accompany La Fayette and others, who were going to assist the revolted American colonies against England. In America he distinguished himself by his bravery, obtained the rank of general officer in the American army with a pension, and after the end of the war returned to his native country. In 1789 he was made major-general in the Polish army. He served with distinction in the campaign of 1792 against the Russians, but king Stanislaus having soon after submitted to the will of the empress Catherine, and Poland being occupied by Russian troops, Kosciusko with several other officers left the service and withdrew to Germany. When the revolution broke out in Poland at the beginning of 1794, Kosciusko was put at the head of the national forces, which were hastily assembled, and in great measure were destitute of arms and artillery. In April, 1794, he defeated a numerically superior Russian force at Raclawice. Again in the month of June he attacked the united Russians and Prussians near Warsaw, but was defeated and obliged to retire into his entrenched camp before the capital. He then defended that city for two months against the combined forces of Russia and Prussia, and obliged them to raise the siege. Fresh Russian armies however having advanced from the interior under Suwarrow and Fersen, Kosciusko marched against them with 21,000 men. The Russians were nearly three times the number, and on the 10th of October the battle of Maczieiwice took place, about 50 miles from Warsaw. After a desperate struggle the Poles were routed, and Kosciusko being wounded, was taken prisoner, exclaiming that there was an end of Poland. The storming of Praga by Suwarrow and the capitulation of Warsaw soon followed. Kosciusko was taken to St. Petersburg as a state prisoner, but being afterwards released by the emperor Paul, he repaired to America, and afterwards returned to France about 1798. Napoleon repeatedly endeavoured to engage Kosciusko to enter his service, as Dombrowski and other Polish officers had done, and to use the influence of his name among his countrymen to excite them against Russia; but Kosciusko saw through the selfish ambition of the conqueror, and declined appearing again on the political stage. A proclamation to his countrymen which the French 'Moniteur' ascribed to him in 1806 was a fabrication. He continued to live in retirement in France until 1814, when he wrote to the emperor Alexander recommending to him the fate of his country. In 1815, after the establishment of the new kingdom of Poland, Kosciusko wrote again to the emperor thanking him for what he had done for the Poles, but entreating him to extend the benefit of nationality to the Lithuanians also, and offering for this boon to devote the remainder of his life to his service. Soon after he wrote to Prince Czartorinski, testifying likewise his gratitude for the revival of the Polish name, and his disappointment at the crippled extent of the new kingdom, which however he attributed 'not to the intention of the emperor, but to the policy of his cabinet, and concluded by saying that as he could not be of any further use to his country, he was going to end his days in Switzerland.' (Oginski, *Mémoires sur la Pologne et les Polonais*, Paris, 1827.)

In 1816 Kosciusko settled at Soleure, in Switzerland, where he applied himself to agricultural pursuits. He died in October, 1817, in consequence of a fall from his horse. His remains were removed to Cracow by order of Alexander, and placed in the vaults of the kings of Poland, and a monument was raised to his memory.

KÖSTRITZ. This locality, south-west of Leipzig, in the valley of the Elster, is quoted by Baron Schlottheim,

Dr. Buckland, Von Meyer, &c., for the occurrence of bones of extinct quadrupeds (hyæna, felis, elephant, rhinoceros, bear, reindeer, &c.) in the fissures and cavities of the limestone and gypsum which occur in that district. Generally, the bones of *extinct* quadrupeds lie in large cavities of the gypsum, while the fissures therein often contain remains of *living* races. Bones of men also occur, but apparently they are of later date than those which accompany the perished races of hyæna, felis, elephant, and rhinoceros. (Meyer, *Palæologica*, p. 458.)

KOSTROMA. [COSTROMA.]

KOTZEBUE, AUGUST FRIEDRICH FERDINAND VON, was born at Weimar in the year 1761. In his sixth year he made attempts at poetical composition, and his interest for theatrical matters was excited by the performances of a company of players at Weimar. At the Gymnasium he was instructed by Musäus, the celebrated author of the 'Volksmährchen' (Popular Tales); and when he was sixteen years of age he went to the University of Jena, where an amateur theatre increased his love for the drama. He studied the law, but at the same time composed slight theatrical pieces. In 1781, at the instance of the Prussian ambassador at the Russian court, he went to Petersburg, and was kindly received by the emperor, who raised him to the rank of nobility, and made him president of the government of Esthonia. While at Reval he wrote several favourite works, and among them his well-known pieces 'Die Indianer in England' (The Indians in England), which has been translated into English, and 'Menschenhass und Reue' (Misanthropy and Repentance), well known in this country under the title of 'The Stranger.' He travelled in 1790 to Pyrmont, and after the death of his wife visited Paris, but returned to Esthonia in 1795, where he wrote above twenty dramas. In 1798 he went to Vienna as poet to the Court Theatre, but gave up that place in two years, and received a yearly pension of 1000 crowns. He had scarcely arrived in Russia, to which country he had returned, when, without knowing the cause, he was arrested and sent to Siberia. A translation made by a young Russian of a paltry little piece by Kotzebue, called 'Der Leibkutscher Peters des Grossen' (The Body-Coachman of Peter the Great), so delighted the emperor Paul that he was recalled from banishment. After the death of this emperor, he went to Weimar, and thence to Jena. Some disagreement with Goethe caused him to remove to Berlin, where he edited the periodical 'Der Freimüthige' (The Free-Humoured).* About the same time he commenced his 'Almanach dramatischer Spiele,' an annual much in the style of those in England, though the plates are of an humbler character, and the literary part is exclusively dramatic. His 'Recollections' of Paris, of Rome, and of Naples, and his 'Early History of Prussia,' appear to have added little to his reputation. The events of the year 1806 caused him to fly from Prussia to Russia, where in his writings he unceasingly attacked the emperor Napoleon and the French. His political expressions at this time raised him to importance, and the turn of affairs in 1813, and the unpopularity of the French, procured him the editorship of a Russian-Prussian paper. In 1814 he went as Russian consul-general to Königsberg, where he wrote several little plays, and an indifferent history of Germany. In 1817, after having again visited Petersburg, he was despatched to Germany by the emperor of Russia, with a large salary, to watch the state of literature and public opinion, and to communicate all that he could learn. He at the same time edited a weekly literary paper, but the German people had at last become disgusted with his scoffing at everything like liberal opinions His writings were levelled against all liberal opinions, and against the freedom of the press. He sneered at every expression of the popular wish for a constitutional government. He held up the state of Europe before the French Revolution as the perfection of happiness; till at last he roused the indignation of Sand, a student and political enthusiast, who, considering him an enemy to liberty, assassinated him in 1819.

Kotzebue's fame rests almost entirely on his dramas, which are nearly 100 in number, and of the most various degrees of merit. The best of them (excepting 'The Two Klingsbergs') have been translated into English. Besides 'The Stranger and 'The Indians in England,' it is only necessary to enumerate 'Lovers' Vows' (Der Strassenraüber aus Kindersliebe), 'Pizarro' (Die Spanier in Peru), 'The Virgin of the Sun,' and 'Benyowski.' Unfortunately for a permanent reputation, he created too great a sensation at the time of his writing; the public were at first delighted, and afterwards surfeited by his exaggerated expressions, his forced situations, and maudlin sentimentality. A reaction accordingly has taken place, and he is now as much despised as he was formerly overrated, and far more so than he merits. It is not fair to criticise him in a merely literary point of view: he was an actual working writer for the stage, and his knowledge of dramatic construction and of stage effect must call forth the approbation of every qualified judge. In his characters he is very unequal: some of them are absolute impossibilities, uttering nothing but the most forced and unmeaning sentiments, while occasionally an exquisite sketch may be found; and it would not be difficult to select from his works scenes of the deepest pathos. He wrote too much. There is a great difference between a writer who gives his thoughts in a dramatic form, and an author who goes on constructing plays whether he has new thoughts or not; and indeed this is the difference between the dramatist, in the high sense of the word, and the mere playwright, to which latter character Kotzebue too frequently approximated. Goethe reckoned as the best of his plays 'Die beiden Klingsberg' (The Two Klingsbergs), a genteel comedy of great merit, but little known in this country.

Kotzebue's dramas had rather an unfortunate effect on the estimation of German literature in England. The wits of the 'Anti-Jacobin' attacked him with great and often well-merited severity, but they mixed up with his works the productions of Goethe and Schiller, and thus writers of the most unequal rank were classed together under the name of the 'German School.' Now that a real knowledge of German literature is spreading, a critic would be ashamed to trust to a mere translation (as did the writers of the 'Anti-Jacobin'); and any attempt to classify so second-rate a writer as Kotzebue with the noble Schiller and the great Goethe would be treated with contempt, excepting where some of the minor and inferior works of the latter might warrant a comparison.

KOTZEBUE, OTTO VON, captain in the Russian marines, was son of the above. In the year 1814 he set out on a voyage round the world, which he completed in 1818, and of which he published an account three years afterwards. He had previously gone round the world as a midshipman under Krusenstern. In 1824 he undertook a third voyage as captain of an imperial man-of-war, when he discovered two islands in the South Sea, and returned in 1826. An account of this voyage was published in London, by Kotzebue's companion, Dr. Eschholz, and by himself in St. Petersburg.

KOULI-KHAN. [NADIR SHAH.]

KRAME'RIA TRIANDRA, or RHATANY, is a small low-lying undershrub, growing on the dry projecting parts of the mountains of Peru, near Huanaco, &c. The native name is Rhataniha. The root, which is the officinal part, is from four to eight inches long, and from half an inch to two inches thick, with knotty but not strong ramifications, and is very variable in shape. The bark is thin, uneven, and easily separates from the woody part. The root is heavy, and devoid of odour; but the taste, especially of the bark, is strongly astringent and bitter, yet not disagreeable. Iodine turns it black. According to the analysis of Gmelin, it contains much tannin, with saccharine and mucilaginous matter, woody fibre, and salts. According to Peschier, it contains krameric acid. This root, from which, in Peru, an extract is formed, is a mild, easily assimilated, astringent medicine, possessed of great power in passive bloody or mucous discharges; and also in weakness of the digestive organs, muscular debility, and even in intermittent and putrid fevers. The powder forms, along with charcoal, an excellent tooth-powder; and an infusion is used as a gargle and wash.

KRAMERIA'CEÆ, a small natural order of Polypetalous Exogenous plants, by most botanists referred to Polygaleæ, but apparently distinct in having stamens separate from the petals, which are disjoined, and all the parts of the flower highly irregular and unsymmetrical. There are from four to five irregular sepals; four or five very irregular petals; from one to four unequal hypogynous

* 'The Free-Humoured' is not a very good expression, but it is hard to find a better. 'Free-thinker' would convey a religious idea, whereas merely an open free person is intended. The book is a little weekly publication, every number of which is adorned with a rude cut of Ulrich von Hütten.

stamens, not bearing any obvious relation to the other parts; and a 1-celled or incompletely 2-celled leathery round fruit, covered with hooked prickles, and containing but one seed. The leaves are alternate, simple, and without stipules. The only remarkable product of the order is rhatany root. [KRAMERIA TRIANDRA.]



Krameriaceæ.

Fruit, Flowers, and Branch of Krameria Triandra.

KRANTZ, ALBERT, born at Hamburg about the middle of the fifteenth century, studied at Rostock, where he took degrees, and was made professor of philosophy and rector of that university in 1482. He afterwards became a canon of the cathedral of Hamburg, was elected syndic in 1488, and was sent by the Confederation of the Hanseatic Towns on several missions to France and England. He died at Hamburg in 1517. He is the author of several historical works:—1. 'Chronica Regnorum Aquilonarium, Daniæ, Sueciæ, et Norvegiæ,' printed in 1546; 2. 'Saxonia, sive de Saxonicæ gentis vetusta origine, libri xii.,' 1520, with a Preface by Cisnerus; 3. 'Wandalia, sive Historia de Wandalorum vera origine, variis gentibus, crebra e patria migratione, regnis item quorum vel autores fuerunt vel eversores, libri xiv.,' 1519; 4. 'Historia Ecclesiastica Saxoniæ,' 1548. All these works have gone through several editions.

KREOSOTE. [CREOSOTE.]

KRISHNA. [VISHNU.]

KSHATRIYAS. [HINDUSTAN, p. 231.]

KUBAN, or KOOBAN, is a river in Russia, which originates in Mount Caucasus, between the principal range and Mount Elbrooz. Having skirted the southern and western declivities of that snow-capped peak, it turns to the north, and afterwards to the west, and again to the north before it leaves the mountain-range near Grigoriopol. It then turns again to the west and flows along the northern offsets of the Caucasus, which it divides from the steppes of the Chernomore Cossacks, or the Cossacks of the Black Sea. Towards its mouth it enters a low flat country, and along its banks salt-marshes extend to a considerable distance. In this plain the river divides into two branches, and forms an island called the Island of Taman. One shallow branch, called by the Russians Chernaya Protoka, runs nearly due north, and falls into the Sea of Azoff. The other branch, which preserves the name of Kooban, continues its western course and falls into the Black Sea, or rather into an æstuary called Kubanskoi Liman, which is united to the Black Sea by a shallow passage scarcely 100 fathoms wide. The Kuban runs nearly 400 miles, and generally with a rapid current between elevated banks. It is navigable for river-barges up to the town of Yekaterinodar, and on its thinly inhabited banks a number of small fortresses have been erected to protect the level country from the incursions of the mountaineers of the Caucasus. (Pallas's *Travels through the Southern Provinces of the Russian Empire*.)

KÜHLOCH, an ossiferous cave on the bank of the Esbach River, near Rabenstein in Franconia, which is described by Dr. Buckland as one of the most remarkable that he had examined. In this cave, whose cavity is nearly equal to the interior of a large church, there are hundreds of cart-loads of black animal dust entirely covering the whole floor, to a depth which must average at least six feet, and which, if we multiply this depth by the length and breadth of the cavern, will be found to exceed 5000 cubic feet. Dr. Buckland observes, 'Many hundred, I may say thousand, individuals must have contributed their remains to make up this appalling mass of the dust of death.' (*Reliq. Diluvianæ*, p. 138.)

The whole of this mass has been again and again dug over in search of teeth and bones, which it still contains abundantly, although in broken fragments. The bones are of a black, or, more properly speaking, dark umber colour throughout, and many of them readily crumble under the finger into a soft dark powder resembling mummy powder, and are of the same nature as the black earth in which they are imbedded. (*Reliquiæ Diluvianæ*.)

KUMAON, a district forming part of the British territory in Northern Hindustan, comprehending an area of 7000 square miles, includes the country between the Ganges and the Kalee rivers, and thus comprises part of the province of Gurwal, from which it is naturally divided by a range of mountains. The whole of this district presents a succession of mountainous ridges, increasing in elevation as they approach the north, until they reach the snowy peaks of the Himalayas. Towards the south the country presents an almost uninterrupted succession of forests, containing many large trees; but in the higher region to the north, where the height amounts to 2500 feet above the plains, tropical productions disappear, there are no longer forests of any description, but in their place numerous groups of trees of various kinds commonly found in Europe; among these are the oak, fir, willow, mulberry, and birch. Ferns and lichens are everywhere seen, as well as wild raspberries and barberries, nettles and thistles. A description of tea-plant is also found wild, but it has an emetic quality which unfits it for use. During the cold season it is common for the farmers to quit their villages in the high grounds, and to proceed with their herds and flocks to the warmer districts below. Pheasants, black partridges, and sometimes woodcocks are seen towards the north. Kumaon is very thinly inhabited, and by a race who do not partake of the hardy character usually shown by the natives of so cold a region. In complexion they resemble the Chinese, but their features point them out as of Hindu origin. Before the country came under English dominion, the natives were much oppressed by the Gorkhas, whose periodical incursions continually deprived them of the fruits of their toil, and entirely prevented the accumulation of property. At length, in 1799, the Gorkhas made a conquest of the country, and retained possession of it until 1815, when, after a short campaign, it was acquired by the English, to whom it offers but little advantage in the way of revenue. The chief benefit which it affords is derived from its climate, which is found to be almost as efficient in restoring its tone to the constitution of Europeans as a visit to Europe. For this purpose the capital, Almorah, is much frequented. [ALMORAH.]

KUPFERSCHIEFER, in geology, the German name (meaning copper-slate) for certain laminated rocks at the base of the magnesian limestone formation of Thuringia, which are impregnated with copper, and richly stored with Palæonisci and other fossil fishes. The equivalent beds in England (*e.g.* at Ferryhill in the county of Durham and at Whitley in Northumberland) are called 'marl slate,' and are equally rich in similar, if not identical fishes. The cause of their (perhaps contemporaneous) destruction at such distant points is an interesting subject of geological speculation. (Agassiz, *Recherches sur les Poissons Fossiles*; Sedgwick, *On Magnesian Limestone*, in *Geol. Trans.*)

KUR, or KOOR, the antient Cyrus, a river in Asia, rises near 41° N. lat. and between 42° and 43° E. long., on the eastern declivity of the mountain-range which divides the waters falling into the Caspian Sea from those which run to the Black Sea. Its sources are a little south-west of the town of Ardahan, belonging to the Pashalik of Kars; but after a course of about fifty miles in an eastern direction it leaves the Turkish empire and enters Russia, where it gradually turns to the north, and passes near the fortress of Akaltsic or Ahkiskhar. The river afterwards gradually declines more to the east, until it runs east-south-east, and receives from the southern declivity of Mount Caucasus the Arakui or Aragbor, a rapid river, which brings down a great mass of

water Below this junction the Koor is a very considerable river, and runs nearly south, passing the large town of Tiflis. So far its course is bordered by high, steep, and rocky banks, and traverses a hilly country. Below Tiflis it enters the Plain of Kara, where its banks are alternately low and high, the plain being considerably elevated above its bed, so that the water of the river cannot be used for irrigating any part of it. In this plain several springs of petroleum occur. The Koor runs through the plain mostly in an east-south-eastern direction, and at its termination its waters are increased by those of the Alazon, another powerful river, descending from the southern declivity of Mount Caucasus. After this junction the river traverses a hilly country of some extent, passing through the narrow part called Manga, and then enters that extensive plain which extends along the Caspian Sea from Baku to the Bay of Kizil Agatch for about 120 miles, and along the course of the river for about 150 miles. This extensive plain is broken by isolated hills and numerous salt-marshes. Some of the hills along its northern border are mud-volcanoes, and in many places springs of petroleum occur. Near the banks of the Koor the country is subject to inundations, and overgrown with rushes to a considerable distance. The districts nearest the sea coast have a soil impregnated either with salt or petroleum, and are completely sterile, such as the Mogan desert; but towards the hills and mountains which surround the plain the soil is tolerably fertile. About 70 miles from its mouth the Koor receives the Aras. [ARAS.] After its junction with the Aras, the Koor becomes navigable for moderate-sized vessels, and is about 140 yards wide. About 20 miles from the sea the river divides into several branches, of which the outermost are the largest. On the left main branch is the town of Salian, a collection of villages rather than a town, but a wealthy place, on account of the productive fishery which is carried on by the inhabitants in the river, and especially at its mouth. The fish taken here are the same species which are caught at Astrakhan. The delta of the Koor projects several miles into the Caspian Sea. The whole course of the river is about 560 miles. (Dr. Reinegg's and Marshal Biberstein's *Description of Mount Caucasus*.)

KURDISTAN. [PERSIA.]

KURILE ISLANDS extend from Cape Lopatka, the southern extremity of the peninsula of Kamtchatka, in a somewhat curved line, to Cape Broughton, the north-eastern extremity of the island of Yeso. Some geographers even consider the last-mentioned island as one of the Kuriles. They are twenty five in number, besides numerous rocks, and are all of volcanic origin, consisting of high masses of lava. Ten active volcanoes are known to exist on the nineteen northern islands. The vegetation is scanty, and on those near Kamtchatka trees do not grow; but the southern islands are more fertile, especially Kunashir and Iturup, on which the Japanese have settled. The remainder are claimed by the Russians as an appendage to Kamtchatka, and they even established a settlement on Urup, in 1828, for the purpose of hunting the numerous wild animals, especially beavers, which are found there. The natives are partly Kamtchadales and partly Aïnos, a tribe which seems to belong to the same race as the Japanese. Both tribes live on the produce of the chace, or rather of their fisheries. The Japanese have introduced agriculture into the islands which have been settled by them.

KURLAND. [COURLAND.]

KURSK, a large government of European Russia, lies between 50° 20′ and 52° 26′ N. lat. and 33° 40′ and 38° 20′ E. long. It is bounded on the north by Orel, on the east by Voronetz, on the south and south-west by Slobodsk-Ukraine, and on the north-west by Tschernigov. Its area is 14,720 square miles. The extreme breadth is 150, and its extreme length 200 miles. The surface of the province is undulating. It contains no mountains, but is traversed by many small eminences. There are no large rivers or large lakes, nor are the forests extensive. The soil is fertile and well cultivated, and the country populous, and covered with villages. The soil generally consists of a rich mould, of sufficient depth, over a thick clayey or loamy bottom; sand or stiff clay occurs but rarely, and heath and moor still more rarely. The hills consist of clay, marl, lime, freestone, and chalk. The principal river is the Donetz, which, after being joined by the Oskol, Uloscha, and other rivers, flows into Slobodsk-Ukraine, where it joins the Don. Neither the Donetz nor any of the other rivers, of which there are 13 large and 495 smaller, is navigable. The Sem, or Seim, runs into the Desna, and consequently belongs to the basin of the Dnieper. Among the rivers that join it is the Swava, which comes from Orel and has many ruins and tumuli on its banks. The streams are not frozen over till the end of November or the beginning of December, and are free from ice at the beginning of March. In some parts the tapeworm is endemic among the people, and the liver-fluke in the cattle. The corn occasionally suffers from blight.

Kursk is one of the most fertile provinces of the empire, and in Great Russia at least is next to Orel in the abundance of its harvests. The soil is so rich that it needs no manure. When it is exhausted, it is suffered to lie fallow for three or four years. The system of agriculture is very rude: new ground is broken up with a large plough, drawn by three or four yoke of oxen; old lands are turned or scratched up with a light plough. The harvest begins in July: the corn is dried and threshed in the field; there are no barns, but the grain is deposited in pits in the ground, where it may be preserved for six or ten years, only covered with sods or boards. The commonest kinds of grain and their produce are:—winter rye, which yields from seven to nine fold; winter wheat, from three to six fold; barley, from seven to twelve fold; oats, from eight to nine fold; peas, from five to seven fold; buck-wheat, from two to five fold; millet, from eight to forty fold; and poppy, from twenty to forty fold. The other products are chiefly hemp and tobacco and some flax. Horticulture is very general and successful; all the vegetables usual in Germany are cultivated and thrive well: near the capital and on the estates of the nobility the more delicate vegetables are cultivated, and hops sufficient for consumption are found in most gardens. There are apples, cherries, and various sorts of plums; but scarcely any pears, except the wild sort, which is preserved. There is an abundance of hazel-nuts and wild berries: melons and water-melons are grown in the open fields. There is some wood in small coppices in most of the circles, but not enough for consumption in any, and all must at least import timber for building. In some they are obliged to use straw and cowdung for fuel. The crown forests cover an area of only 330 square miles. There are few beasts of the chase in these woods, but great numbers of wolves and foxes, the fur of which is of inferior quality. Hares, bustards, partridges, and quails abound. The breeding of cattle is indeed subsidiary to agriculture, but is carried on very extensively. The horses are of the Russian breed, but nearly equal to those of the Ukraine. Horned cattle are kept in great numbers, because oxen alone are employed in agriculture. Numbers of cattle are fattened, and cows are kept for the purposes of the dairy, but with less advantage than might be done. The sheep are of the Russian breed, and their wool is indifferent. Merinos do not thrive. The inhabitants keep numbers of swine and domestic poultry; and so many bees, that honey and wax are articles of exportation. There is scarcely any fish. The minerals are, some iron (of which no use is made), limestone, flints, and saltpetre.

Agriculture and the breeding of cattle are the most profitable and the chief employments: very few hands are engaged in manufactures. Such clothing as the countryman wants—shirts, stockings, gloves, and caps, are of his own manufacture. He often makes his own household furniture and farming implements, and builds his own house; so that he scarcely needs the help of the mechanics, of whom however many are settled in the villages, who make articles for sale and frequent the fairs. The manufactures are chiefly in the towns, the most industrious of which are Kursk and Belgorod. The exports consist of the natural productions of the country, which are mostly sent by land to the Volga and thence to Petersburg. Lately attempts have been made to send them by the Sem and the Desna to Odessa.

The population, which amounts to 1,720,000, consists partly of Great, partly of Little Russians; most of the latter came into the province in the 18th century. There are few strangers, but there is one entire village of gipsies, and many unsettled families of that people who lead a nomadic life. The head of the Greek church is the archbishop of Kursk and Belgorod, whose diocese is of the third class, and who has 870 churches under him.

KURSK, the capital of the government, in 51° 43′ 30″ N. lat. and 36° 27′ 45″ E. long., is the residence of the military governor of Kursk and Orel, of the civil governor and

authorities, and of the archbishop. It lies on the Tuskar, or Tuskara, where it is joined by the Kara, at the foot of a hill on which there is an old decayed fortress. The town is surrounded with palisades, the old rampart having been converted into walks and gardens. The streets are narrow and crooked, but they are paved. There are twelve stone and four wooden churches, two convents, an ecclesiastical seminary, a gymnasium, hospital, and other public buildings, and several manufactories. The population is stated at 24,000. A very great annual fair is held on a heath at Koreaja Pustinja, a village in the circle of Kursk, about 12 miles from the town, which is attended even by merchants from Germany.

KUSTER, LUDOLF, born in 1670, at Blomberg in Westphalia, studied at Berlin, and afterwards visited various parts of Europe, where he became connected with the principal scholars of his age. In 1696 he published a critical dissertation on the history of Homer and his works: 'Historia Critica Homeri, qua de scriptis ejus tam deperditis quam extantibus, spuriis ac genuinis; de fatis, judiciis, studiisque hominum quæ idem poeta per omnia sæcula expertus est; necnon de rhapsodis, criticis, omnibusque iis qui aliquam in illustrando Homero, tam priscis quam nostris sæculis, operam posuere, agitur.' F. A. Wolff reprinted it in the first volume of his edition of Homer, 1785. Kuster went afterwards to Utrecht, where he remained some years, and contributed several papers to the 'Thesaurus Antiquitatum Romanarum' of Grævius, and to the 'Thesaurus Antiquitatum Græcarum' of James Gronovius. While at Utrecht, he also published a literary journal in Latin: 'Bibliotheca Librorum Novorum, collecta a L. Neocoro, ab Aprili, anno 1697, ad Decembrem, 1699.' Neocorus is the Latinized form of his name, which Kuster assumed in his works according to the fashion of the times. In the year 1700 he repaired to England, where he undertook to edit a new edition of Suidas, which was published at Cambridge, 3 vols. fol., 1705. In 1707 he published at Amsterdam the 'Life of Pythagoras,' by Iamblichus; and in 1710 he produced an edition of Aristophanes, with the Scholia. James Gronovius having criticised with his customary bitterness and ill temper Kuster's 'Suidas,' Kuster replied to him in his 'Diatribe Anti-Gronoviana, in qua editio Suidæ defenditur, itemque haud pauca loca Hesychii emendantur, et denique quid fuerit *Æs grave* apud veteres Romanos explicatur. Accedit Diatribe de verbo *cerno*,' Amsterdam, 1712. In this last dissertation on the verb 'cerno,' Kuster gave a specimen of a series of observations on the Latin language, about which he had been busy for years, but which he left incomplete at his death. This dissertation also led him into a controversy with Perizonius. About 1713 Kuster, being then at Paris, obtained from Louis XIV., through the friendship of L'Abbé Bignon, a pension of 2000 livres, and was made a member of the Academy of Inscriptions. He died at Paris in 1716. His notes on Hesychius, which he left in manuscript, were inserted by J. Alberti in his edition of Hesychius, 2 vols. fol., 1746. Kuster was one of the best scholars of his time.

KUTCH. [CUTCH; HINDUSTAN.]

KUTEERA, or KATI'RA, a kind of gum, considered in India by the native practitioners of medicine to be a good substitute for Tragacanth. Indeed, they consider it to be the true Tragacanth, which is described by Avicenna under the name *kuseera* in the original Arabic, while the plant which yields it is named *Ketad*, and its gum *Dragacanthum*. The Kuteera gum a good deal resembles Tragacanth in appearance, but does not in other respects correspond with that gum, according to the experiments which have been made on it in Europe. It has been described by Martius under the name *Kuteera* (*Pharmakognosie*, p. 338), which Guibourt says is the same as his *Gomme de Bassora*. Dr. Roxburgh states that *Sterculia urens* 'yields a gum not unlike Tragacanth, and has been sent to London as such; but the artists, who use that gum, did not find it answer.' He however mentions that the water in which he kept the green branches for examination became thick, like a clear glutinous jelly, while the bark was exceedingly astringent. (*Fl. Ind.*, p. 111.) Dr. Royle, on the contrary, states that the gum called *Kuteera*, and used as a substitute for Tragacanth in north-western India, is yielded by *Cochlospermum Gossypium*, and he possesses some of the same kind of gum collected by Mr. Malcolmson in Central India, accompanied with specimens of the tree which yielded it. This is identically the above-named species, which is so highly ornamental on the lower mountains of India, with its large and rich-coloured yellow flowers.

KUYP, or CUYP, ALBERT, was the son and disciple of Jacob Gerutze Kuyp, an eminent landscape painter of Dort, and a pupil of Abraham Bloemart. Jacob's works, chiefly views from nature in the environs of Dort, were highly and justly valued, and his memory was held in esteem at Dort for having founded in 1642 the Academy of Painting of St. Luke in that town, in conjunction with J. van Hasselt, Corn. Tegelberg, and J. Grief. His son Albert was born at Dort in 1606. Though his father's disciple, his manner is very different, and he embraced a greater variety of subjects. 'The pictures of this master,' says that profound critic Dr. Waagen, 'are the most splendid proofs that the charm of a work of art lies far more in a profound and pure feeling of nature, in the knowledge and masterly use of the means of representation which art supplies, than in the subject itself; for otherwise how would it be possible from such monotonous natural scenery as Holland affords, where the extensive green levels are broken only by single trees and ordinary houses, and intersected by canals, to produce such attractive variety as their pictures offer? How could it happen that so many pictures, even of eminent masters, such as J. Both and Pynaker, who represent the rich and varied scenery of Italy, have less power to touch our feelings than those of Kuyp, Ruysdaal, and Hobbima? In elevation of conception, knowledge of aerial perspective, with the greatest glow and warmth of the serene atmosphere, Kuyp stands unrivalled, and may justly be called the Dutch Claude. In the impasto, the breadth and freedom of execution, he greatly resembles Rembrandt.' Though Kuyp is reckoned among the cattle-painters, all kinds of which he represented with equal truth and felicity, he likewise painted landscapes, properly so called, and sea-pieces. He excelled in every thing that he attempted; and yet it is remarkable that he has been comparatively little known abroad. Scarcely anything is known of the circumstances of his life; even of the year of his death we can find no record. Kuyp's works were so low in value, that a beautiful picture of his, for which Sir Robert Peel paid 350 guineas, was bought at Hoorn, in Holland, some years ago, for one shilling English. He is a great favourite in England, and it is here that his finest works are found, chiefly in the National, Bridgewater, Grosvenor, and Dulwich Galleries, in the collections of Sir Robert Peel, Lord Yarborough, the duke of Bedford, the marquis of Bute, his late Majesty George IV., and the late Sir Abraham Hume.

KYANITE, CYANITE, DISTHENE, SAPPARE. This mineral occurs crystallized and massive. Primary form a doubly oblique prism. Cleavage parallel to the faces of the primary form. Fracture uneven. Hardness of the sharp portions sufficient to scratch glass. Colour white, yellow, and various shades of blue and green. Streak white. Lustre vitreous, pearly. Transparent; translucent. Specific gravity 3·6.

By the blow-pipe infusible, and merely becomes white even in a very strong fire; with borax readily dissolves into a colourless transparent glass.

	Analysis by Laugier.	Analysis by Arfwedson.
Silica	38·50	34·33
Alumina	55·50	64·89
Lime	0·50	
Oxide of iron	2·75	99·22
Water and loss	2·75	
	100·	

Found in Switzerland, in Scotland, and many other parts of Europe, and also in North and South America.

KY'DIA, a genus of trees of the natural family of Byttneriaceæ, which is sometimes called Sterculiaceæ. The species are only two in number, found in the hilly parts both of Peninsular and Central India, as well as all along the foot of the Himalayan mountains. The genus is distinguished by its monadelphous stamens, having the tube split about the middle into five segments, each bearing four anthers fascicled together at the apex. The trees are moderate sized, with alternate five-nerved, somewhat five-lobed leaves. The flowers are white and panicled. *K. calycina*, having the exterior calyx or involucel four-leaved, and larger than the petals, is called *chuo-puttea*, or

four-leaved, by the natives of India. Like the greater portion of the family to which it belongs, this genus abounds in a bland mucilage, for which its bark is employed in clarifying sugar in the same way as that of Guazuma ulmifolia, belonging to the same family, is in the West Indies.

Dr. Roxburgh, in establishing this genus, says, 'I have ventured to give it the above name in memory of the late Colonel Robert Kyd, of Bengal, whose attachment to botany and horticulture induced him to retire from the high rank he held in the army, to have more leisure to attend to his favourite study, to the advancement of every object which had the good of his fellow-creatures in view, and to the establishment of the Honorable East India Company's botanic garden at Calcutta, where he was particularly attentive to the introduction of useful plants, and to their being dispersed over every part of the world for the good of mankind in general.'

INDEX TO THE LETTER K.

VOLUME XIII.

L.

L is a liquid formed at that part of the palate which is near the teeth. It is therefore allied at once to the adjoining liquids *r* and *n*, and to the palato-dental consonants. The various forms which the letter has assumed may be seen in ALPHABET. The interchanges to which it is liable are as follows:—

1. *L* is interchangeable with *r*. Hence from the Greek or rather Latin *apostolo, epistola*, the French have derived *apostre, apôtre; epistre, epître*. Again, in Latin, while from *rivo*, a stream, *rivali*, living near the same stream, and from *aevo*, age, *aequali*, of the same age, are derived; yet *populo* and *familia* lead to the adjectives *populari, familiari*, belonging to the same people, or the same family. These last words it will be observed already possessed an *l*. In the same way the well known town on the African coast has been called at different times *Algiers* and *Argel*. The Spanish *coronel* corresponds to our *colonel*. Caralis, in Sardinia, is now Cagliari. Salamanca was called in antient times Salmantica and Hermandica.

2. *L* with *n*, as *Barcino* (onis), *Barcelona*; *Ruscino, Roussillon*; *Bononia, Bologna* or *Boulogne*, *Nebrissa, Lebrixa*; πνευμων from πνεω or πλευμων, Lat. *pulmo*; *benus* and *bellus* in Latin, βεντιστος and βελτιστος in Greek; λιτρον, *nitrum*; *anima* in Lat., Ital. *alma*.

3. *L* with *d*, as *St. Aegidius*; *St. Giles*; *gridiron*, meaning *grill-iron*; and the English title *admiral* is derived from the Spanish *almirante*. But see D, No. 4. L is also interchangeable with *t*. (See T.)

4. *Ll* in the middle of words with *li*. Examples of this are abundant in the French pronunciation of the *l mouillé*. Hence from the French *billards* is derived without much alteration of sound the English *billiards*. It is somewhat strange that the English name *Villiers* and the French *Villars*, which are no doubt of the same origin, should be pronounced so perversely that the first writes an *i* and omits to sound it, the second gives an *i* to to the ear and none to the sight. This change prevails between the Greek and Latin languages, as φυλλο and *folio*, a leaf; αλλο and *alio*, other; 'αλλ and *sali*, leap. Even in the Greek itself μᾶλλον must be a corruption, as analogy would require μαλα, μαλιον, μαλιστα. It is probable indeed that the Greeks gave to the double *l* in this word the same sound as the French now do. On any other principle it would be impossible to defend the circumflex accent, which is only placed on syllables terminating in a vowel. It would perhaps not be wrong to write σκῦλλο rather than σκῦλο, corresponding to the Latin *spolio*, a skin or covering. With these forms may be compared *Mallorca*, pronounced *Mayorca*, the Spanish name for *Majorca*. Lastly, the Portuguese write *lh* with the same sound.

5. *L* disappearing. Not very dissimilar is the Italian interchange of *pl, cl, fl*, with *pi, chi, fi*; as from *pleno*, full, *pieno*; *plano*, flat or low, *piano*; *Placentia, Piacenza*; *clavi*, a key, *chiave*; *claro*, bright, *chiaro*; *clāmare*, to call, *chiamare*; and *flor*, a flower, *fiore*; *fluctu*, a wave, *fiotto*; *Florentia*, once *Fiorenza*, now *Firenze*, the existing name of Florence.

This loss of an *l* after a consonant appears in other languages. The German *fliehen*, to fly, has for its chief element *flug*, corresponding to the Latin *fug*. In the same language *flispern* and *fispern* both mean to whisper; *flittich* and *fittich* both mean a wing; *blinzen* corresponds to the English words *blink* and *wink*. The word *dreifach*, threefold, is derived from *drei* and *flach*. Again the Greek ὑπνο and the Latin *somno, sopor*, have *sop* for the radical syllable. In the Gothic *in-suepp-an*, the same root has the form *suep*, but in German *schlaf*, and in English *sleep*. Lastly, the Latin *claud*, shut, and *clavi*, key (words of the same origin, as is proved by the various forms of *suavi*, sweet), appear in German in the form *schluss*, and in English as *shut* and *key*.

6. L with *u*, particularly after an *a*. *Alfidena*, a town, or *Aufidena*; ελεημοσυνη, pity (used by ecclesiastical writers to signify charitable gifts), Ital. *limosina*, Fr. *aumône*, Eng. *alms*; Lat. *altari*, an altar, Fr. *autel*; Lat. *aliqui-uno*, Ital. *alcuno*, Fr. *aucun*; Lat. *ulna*, Fr. *aune*. The French also contract the pronoun and article *à le, à les*, to *au* and *aux*.

7. Many words beginning with an *l* once had other consonants before the *l*: as in Latin, *loco*, a place, *liti*, a suit, *lato*, broad, were once preceded by *st*—thus, *stloco, stliti, stlato*. This explains how *lato* in Latin is the participle of *toll*. It must once have been *tlato*, corresponding to the Greek forms of the same root, viz. τλη-τος, τλη-μων, as well as τολ-μη. Again the English *liquorice* is a corruption from the word *glyco-rhiza*, sweet-root. To this head perhaps belongs the Welsh sound of words beginning with *ll*, as for example all the places beginning with *Llan*, which is pronounced by some as *thlan*, by others as *flan*. Perhaps *lana* and *flannel* are kindred words.

8. *L* is very apt to appear in a root, sometimes before a vowel, sometimes after one, as in the Greek words καλε or κλη, βαλ or βλη, &c. Where this slipping occurs after a sound like *k*, the *l* is apt to be converted into an *r*. Thus the Greek σκαλευ, poke, is in Latin *scru-tari* (compare the phrase *scrutari ignem*, to poke the fire). So καλυπτω and κρυπτω are of the same origin; σκελος and the Latin *crus*, σκολοψ and *crux*; *celeber* and *creber*.

LA, in music, the name given in England, Italy, and France, to the sixth of the syllables used in solmization [SOLMIZATION], and by the two latter countries to the note called A by the Germans and English.

LAALAND, LALAND, or LOLLAND, a bishopric of the kingdom of Denmark, comprises the islands of Laaland and Falster, the united area of which is 660 square miles, and the population 64,000. The island of Laaland is situated in the Baltic, between 54° 39′ and 54° 57′ N. lat., and 10° 56′ and 11° 50′ E. long.: its length from west to east is about 60 miles, its breadth 20 miles, and its area is 460 square miles. The population, which is about 45,000 inhabitants, is less than the island, which is extremely fertile, might support; but the climate is unhealthy and the water bad. The country is low, flat, and has much marsh ground. The soil, as already observed, is extremely fertile, producing all kinds of corn, pulse, flax, hops, potatoes, fruit, timber, &c. for exportation. The inhabitants have great numbers of horned cattle, and fish are very abundant. There are four towns in the island: Mariboe, situated on a lake, which, though it has not 1000 inhabitants, is considered as the capital; Naskow, with 2000 inhabitants, which has a good harbour and considerable trade; Nyestedt, with 800 inhabitants, who follow the seal fishery; and Rödbye, with 900 inhabitants, on a bay with many small islands, from which is the passage to Femern and to Heiligenhafen in Holstein.

LABARRAQUE'S DISINFECTING LIQUIDS. Solution of chloride of lime and of chloride of soda. [FUMIGATION.]

LA'BEO (Cuvier), a genus of fishes belonging to the Cyprinidæ. The species of this genus resemble the true carps in having the dorsal fin long, but they do not possess the strong spine of the anal and dorsal fins. The lips are very thick and fleshy, and more or less crenulated. There are no cirri. An illustration of this genus will be found in the *Cyprinus Niloticus* of Geoffroy St. Hilaire. (See *Poissons du Nil*, pl. xi., f. 2.) The *Cyprinus fimbriatus* of Bloch, Schn., p. 441, sp. 24, and the *Catostomus cyprinus* of Lesueur, also belong to the genus Labeo, which has no representative in the European seas.

LABEO, C. ANTISTIUS. [JUSTINIAN'S LEGISLATION.]

LA'BIA. [FORFICULIDÆ.]

LABIA'TÆ. [LAMIACEÆ.]

LABIDOURA. [FORFICULIDÆ.]

LA'BIDUS. [MUTILLIDÆ.]

LABIENUS. [CÆSAR.]

LABLAB, a name, it is said, of Egyptian origin, which has been adopted by botanists to designate a genus of Papilionaceous Leguminosæ of the tribe Phaseoleæ. This genus, like Dolichos, from which it has been separated, is a twisting climber with leaves composed of three large leaflets. The flowers are in racemes, and either white or purple-coloured. The legumes are large, scimitar-shaped, flat, and compressed, tubercularly muricated along the sutures, and having the seeds separated from one another by transverse partitions. It is on account of these seeds

and legumes that the species are valued and cultivated in hot countries such as India, Egypt, and the West India Islands, as well as in China. In Indian *Lablab vulgaris* and *cultratus* are chiefly cultivated in the rainy season in gardens, and may be considered the analogues of the French and kidney beans of European gardens.

LABORATORY, the room in which chemical operations are performed. The requisites for the proper arrangement of and the necessary instruments for a laboratory may be seen at length in Professor Faraday's 'Chemical Manipulation.'

LABORDE, JEAN-BENJAMIN, a voluminous writer on the history of music, who evinces extensive knowledge and more industry than method, was born in Paris in 1734, of a rich family, and received a most liberal education, including music, which he studied under the celebrated Rameau. He was intended for the financial department of government, but his inclination prompted him to seek admission to the gay court of Louis XV., to whom he was appointed *premier valet de chambre*, and soon becoming the favourite and confidant of that prince, was, as a matter of course, led into great extravagance and dissipation. But a passion for music, which by some sour moralists of the last age was supposed to betray men of leisure into injurious habits, saved him from much of the evil that most likely would otherwise have ensued from his connection with a profligate monarch and a vicious court: he composed several operas, and these, though possessing little merit, proved successful, and occupied time which, in all probability, would have been devoted to less innocent pleasures. On the death of Louis, in 1774, M. Laborde resigned his office, married, and entered into a life of comparative tranquillity. He became one of the *fermiers-généraux*, devoted his spare hours to study, and, in 1780, published his 'Essai sur la Musique Ancienne et Moderne,' in four 4to. volumes, a splendid work, got up at vast expense, embellished by a great number of remarkably well-executed engravings, and illustrated by numerous examples of French national music in various forms. This contains an abundance of information, drawn with great labour from authentic sources, and though exhibiting occasional prejudices, and so desultory that it ought to have been entitled a Collection of Essays, rather than *an* Essay, yet it has supplied with facts and materials writers—some of them of no mean reputation—who have not had the candour to acknowledge the slightest obligation.

The French revolution brought in its train the ruin of M. Laborde. A *farmer-general* could expect no favor from those whom the new order of things had placed in power; he therefore withdrew into the country, and lived concealed, till an unlucky indiscretion of a person intimately connected with him made his retreat known. He was conveyed to Paris and committed to prison, where he might have remained, among others, till one of those changes in the government to which so many owed their lives had liberated him; but imprudently, and against the advice of his friends, he pressed for trial, was condemned, and perished on the scaffold on the 20th of July, 1794, just five days before the fall of Robespierre and his sanguinary colleagues.

The great pecuniary resources of M. Laborde, together with his activity and indefatigable industry, enabled him to publish, in a sumptuous manner, many original works; also some translations from the English. Among the former are: an 'Essai sur l'Histoire Chronologique de plus de 80 Peuples de l'Antiquité,' 2 vols., in 4to.; a 'Description générale et particulière de la France,' in folio; and 'Tableaux Topographiques, Geographiques, Historiques, &c., de la Suisse,' 4 vols., in folio.

LABOUR. [WAGES; WEALTH.]

LABOUR, PAYS DE. [BASQUES, PAYSDES; GUYENNE and GASCOGNE.]

LABRADOR. [HUDSON'S BAY.]

LABRADORITE, LABRADOR FELSPAR, occurs in rolled or imbedded crystalline masses. Cleavage parallel to the planes of a doubly-oblique prism; fracture uneven, conchoidal; hardness 5·5 to 6·5, scratches phosphate of lime, and is scratched by quartz; colour white, grey; richly iridescent; lustre vitreous; translucent; specific gravity 2·69 to 2·76.

When powdered and heated in muriatic acid it gelatinizes; on charcoal before the blowpipe, fuses into a compact glass, with a brilliant fracture.

Found on the coast of Labrador; and in Devonshire imbedded in a trap rock. It is probably a variety of Albite.

Analysis of the mineral from Labrador—

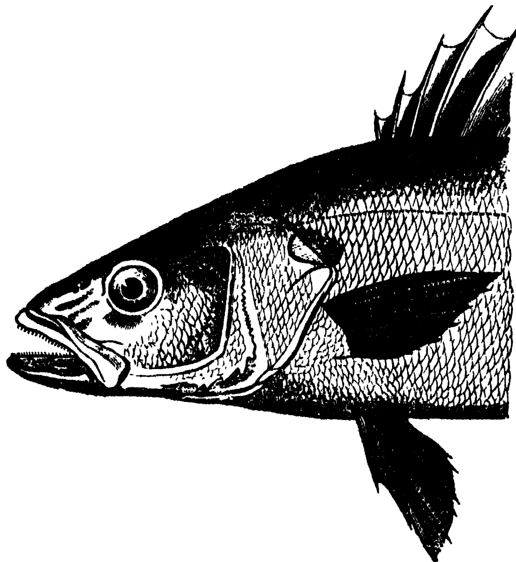
Silica	55·75
Alumina	26·50
Lime	11·00
Soda	4·00
Oxide of Iron	1·25
Water	0·50
	99·

LABRAX (Cuvier), a genus of fishes of the section Acanthopterygii and family Percidæ. The fishes of this genus are closely allied to the true Perches, but may be distinguished by the opercular bones being covered with scales, the absence of denticulations on the suborbital and interopercular bones, the operculum being terminated by two spines, and likewise by the tongue being almost entirely covered with minute and closely set teeth. There are two dorsal fins.

The *Labrax lupus* (Cuvier), a fish commonly known in this country by the name of the *Basse*, and sometimes called the *Sea-dace*, is abundant in the Mediterranean; its flesh being excellent food, it has been long known, and was called by the Romans *Lupus*, and by the Greeks *Labrax*.

The *Basse* is not unfrequently met with on our own shores: it is generally from about twelve to eighteen inches in length, but sometimes attains a much larger size. The upper parts of the head and body are dusky-blue, passing into silvery-white on the sides and belly; the fins are pale-brown. In form it very much resembles the perch, and, like that fish, it has two distinct dorsal fins, the rays of the first being spinous, and those of the second being flexible the scales are of moderate size.

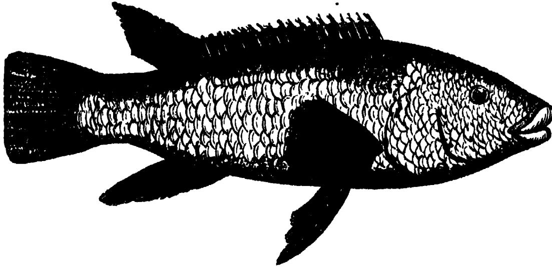
The *Rock-fish* or *Striped Basse* of the United States (*Labrax lineatus* of Cuvier and Valenc.) also belongs to the present genus, and indeed very closely resembles the *L. lupus* in form, but attains a larger size, and is adorned with seven or eight longitudinal black lines on a silvery-ground colour. There is also a second American species of Basse, the *Labrax mucronatus* of Cuvier and Valenciennes, which differs from the former in having no black lines on the sides of the body, and in being of a smaller size and deeper and shorter form.



Head of Labrax Lupus.

LA'BRIDÆ (Labroïdes, Cuvier), according to Cuvier's 'Règne Animal,' a family of fishes of the order Acanthopterygii. The fishes belonging to this family are of an oblong form, covered with scales, usually of large size, formed of simple laminæ, and with the external or posterior margin smooth; they have a single dorsal fin supported in front by spinous rays, each of which is generally furnished with a membranous appendage; the jaws are covered by thick fleshy lips; two upper pharyngeals are attached to the cranium, and, together with a large lower pharangeal, are armed with teeth, which are large and rounded, some-

times pointed or laminated, and generally very strong. The intestinal canal is without cœca, or when these appendages are present they are of small size, and there is a simple and strong natatory bladder. The following genera are contained in this family:—*Labrus* proper, the characters of which are—opercula and preopercula without spines or dentations; cheek and operculum covered with scales; lateral line straight, or nearly so. Of this genus, the species of which are called Wrasses, we have several examples on the British coast. The Ballan Wrasse (*Labrus maculatus*, Bloch), is not unfrequently met with on various



The Ballan Wrasse. (Labrus maculatus.)

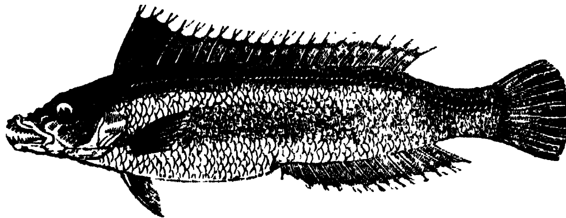
parts of our coast; it is about eighteen inches long, of a red colour above, pale orange beneath, and adorned with bluish green oval spots; the fins and tail are green, with a few red spots, the dorsal fin is spotted at the base. The length of the head compared to the whole length of the fish is as one to four, and the depth of the body is equal to the length of the head. The fin-rays are, dorsal, 20 + 11; pectoral, 15; ventral, 1 + 5; anal, 3 + 9; caudal, 13. Besides this species we have the Green-streaked Wrasse (*Labrus lineatus*), the Blue-striped Wrasse (*Labrus variegatus*, Gmel., Linn.), the Sea-wife (*Labrus vetula*, Bloch), the Red Wrasse (*Labrus carneus*, Bloch), the Comber Wrasse (*Labrus comber*, Gmel., Linn.), all of which are described in Mr. Yarrell's 'History of British Fishes.'

Genus *Cheilinus*, Lacép.—The species of this genus differ only from the true Labri in having the lateral line interrupted opposite the end of the dorsal fin, and commencing again a little below the break. The scales on the tail are large, and extend on the fin These fishes inhabit the Indian Ocean, and are very beautiful in colouring.

Genus *Lachnolaimus*, Cuv., may be thus characterized:—anterior spines of the dorsal fin with long flexible filaments; pharyngeals furnished with a villous membrane, with rounded flat teeth on the hinder part. The known species are from America.

Genus *Julis*, Cuvier, is distinguished from Labrus proper by the head being entirely smooth and without scales, and the lateral line being suddenly bent opposite the end of the dorsal fin.

Julis Mediterranea, Risso (Julis vulgaris, Cuvier), the Rainbow Wrasse, has been caught off the British coast; but



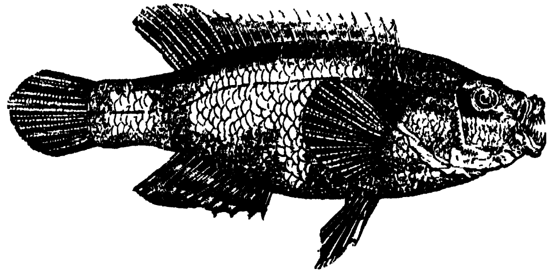
The Rainbow Wrasse. (Julis Mediterranea.)

it appears here to be scarce, though a well known fish in the Mediterranean. It is of a slender and elongated form, and remarkable for the elegant distribution of its colours, which change according to the light and position: on each side of the body is a broad dentated stripe, extending from the head nearly to the tail, of a silvery and fulvous colour. The fin rays are:—dorsal, 9 + 13; anal, 2 + 13; caudal, 13; pectoral, 12; and ventral, 1 + 5. A specimen described by Donovan, which exceeded seven inches in length, was caught off the coast of Cornwall, and is the only recorded instance of the occurrence of the species on the British coast.

The species of the genus *Anampses* of Cuvier differ from those of the genus *Julis* in having two flat teeth in each jaw, which project and curve outwards.

The genus *Crenilabrus* of Cuvier has the general characters of Labrus proper, but the margin of the preoperculum is dentated.

Crenilabrus Tinca, Flem., called the 'Gilt-head,' 'Connor,' &c., is found on many parts of our coast, and indeed is one



The Gilt-head. (Crenilabrus tinca.)

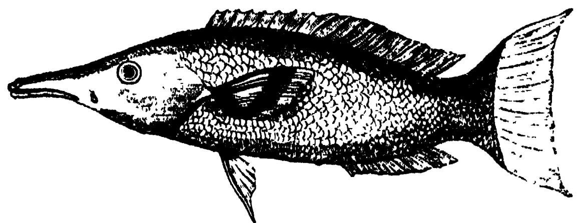
of the commonest species of the family Labridæ we possess it is from eight to ten inches in length; the upper parts are marked with alternate red and bluish longitudinal lines; below the lateral line the colour is bluish-green, spotted with dull red; head brownish-red, with undulating lines of an azure-blue colour; dorsal, caudal, and ventral fins, bluish-green, spotted, and lined with red: pectorals pale and immaculate; greatest depth of the body very nearly one-third of the entire length.

The works on British fishes contain three other species of the present genus. The Goldsinny (*Crenilabrus cornubicus*, Risso), the Gibbous Wrasse (*Crenilabrus gibbus*, Flem.), and the Scale-rayed Wrasse (*Crenilabrus luscus*, Yarrell).

In the genus *Coricus*, Cuvier, we find the same characters as in *Crenilabrus;* but the mouth is protractile, though not quite in so great a degree as in the next genus, *Epibulus* (Cuvier), where the species have the power of extending the mouth to a great degree: in the fishes of the last-mentioned genus the head and body are covered with large scales, which extend both on the caudal and anal fins; the lateral line is interrupted, and there are two long conical teeth in each jaw, behind which the teeth are comparatively small and blunt. The only species known (*Epibulus insidiator*) inhabits the Indian Ocean. *Clepticus* (Cuvier), which is the next genus in succession, has for its distinguishing characters—the snout small and cylindrical, which may be suddenly protruded like that of Epibulus, but which is not so long as the head: the teeth are minute, the body oblong, and the head obtuse; the lateral line is continuous, and the dorsal and anal fins are almost entirely enveloped by scales. But one species is known (the *C. genizara*, Cuv.), and this is from the Antilles.

In the genus *Gomphosus* (Lacépède), the muzzle is remarkably long and slender, owing to the prolongation of the maxillary bones; the head is smooth, as in *Julis*. The species inhabit the Indian Ocean.

Gomphosus viridis, Bennett,* is found off the coast of Ceylon, and is of a dark green colour; the pectoral fin is marked with a black streak.



Gomphosus viridis.

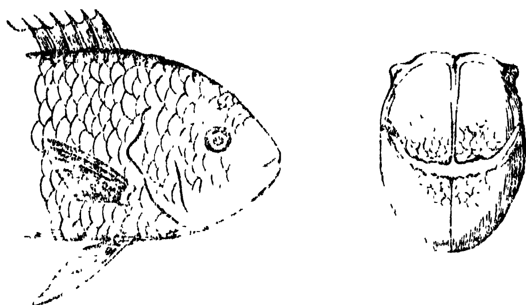
Xyrichthys (Cuvier).—The fishes of this genus are of a compressed form, and have the profile of the head high and nearly vertical: the body is covered with large scales; the lateral line is interrupted; the jaws are furnished with a range of conical teeth, of which those in the centre are the longest; the pharynx is beset with hemispherical teeth. The compressed form and almost vertical profile of the head caused the older authors to arrange these fishes with the Coryphænæ. The *Xyrichthys novacula* (*Coryphæna novacula*, L.), or Razor-fish of the Mediterranean, affords an example of this genus: it is of a red colour, irregularly striped with blue.

* See Bennett's 'Fishes of Ceylon.'

Genus *Chromis*, Cuvier.—With the thick lips, protractile intermaxillaries, pharangeal bones, filaments to the dorsal spines, and the general appearance of a Labrus, these fishes have the teeth in both jaws and on the pharangeals slender and thickly set, or, as Cuvier describes them, *en cardes*, but in front of these there is a range of conical teeth. The vertical fins are filamentous. The ventral fins are often prolonged into long filaments. The lateral line is interrupted. A small species of this genus, which is of a chesnut-brown colour, is common in the Mediterranean; it is the *Sparias chromis*, Lin.· another species is found in the Nile, the *Labrus niloticus*, Hassels, &c. The genus *Cychla* (Bloch, Schn.) differs from Chromis in having the body more elongated, and in having the whole of the teeth very slender and thickly set, like the pile on velvet, and forming a broad band: it contains numerous species. The genus *Pseliops* (Cuvier) differs from Chromis in having the head compressed, the eyes placed near to each other, and the ventral fins much elongated.

Malacanthus, Cuvier.—In this genus there are the general characters of Labrus; the maxillary teeth are nearly the same, but the pharyngeal teeth are *en carde*, as in *Chromis*. The body is elongated, the lateral line continuous, the operculum is produced posteriorly into a little spine, and the long dorsal fin has but a small number of slender and flexible spines in front. One species is found in the Antilles, which is of a yellowish colour with irregular transverse violet stripes and has a crescent-shaped tail: it is the *Coryphæna plumieri* of Lacépède.

Genus *Scarus*, Linn.—The species of this genus, commonly known by the name of Parrot fishes, are remarkable for the convex and rounded form of the jaws, which are beset with several series of scale-like teeth, which are so soldered together, that they usually appear to form solid masses of enamel: these teeth succeed each other from behind forwards; those at the base, being the most recent in formation, in time replace those above, and themselves form the cutting edge. When alive, the fleshy lips nearly cover the teeth. In general form and in the large scales with which the body is covered the Parrot-fishes resemble the true Labri; their pharyngeals, like them, are furnished with teeth, but they consist of transverse laminæ.



Head of a Scarus; and the jaws—natural size.

These fishes are chiefly confined to the seas of hot climates, and are of very brilliant colours, which last circumstance, combined with a fancied resemblance between the mouth and the beak of a parrot, has given rise to the name of Parrot fishes. Some of them have a crescent-shaped tail, and of these there are a few in which the forehead is very gibbous; in others, the tail is truncated. Cuvier has separated from the Parrot-fishes, under the generic name *Calliodon*, those species in which the lateral teeth of the upper jaw are square and pointed, and in which there is an interior range of much smaller teeth in the same jaw; and lastly, M. Cuvier has established the genus *Odax* for the reception of those Labroid fishes which approach the genus *Labrus* in having the lips thick and fleshy, and the lateral line continuous, and the jaws composed like those of *Scarus*, but which are however flat and not gibbous, and are covered by the lips; the pharyngeal teeth are as in Labrus. The *Scarus pullus* of Bloch (Schneider) belongs to this genus; the fish is found off the coast of New Zealand, is of a blackish brown colour, and furnished with small scales.

LABROIDES. [Labridæ.]

LABRUS. [Labridæ.]

LA BRUYERE. [Bruyere, La.]

LABURNUM, the common name of the European trees named by botanists Cytisus alpinus and C. laburnum. It is a native of the Alps of Europe, and is well known in gardens for the beauty of its pendulous racemes of beautifu yellow flowers. The seeds of Laburnum contain a poisonous substance called Cytisine; and the wood, which is olive-green, hard, and compact, is occasionally used by the turner for ornamental purposes.

LABYRINTH. [Crete; Faioum.]

LA CAILLE, NICHOLAS LOUIS DE. The following account is almost entirely from Delambre, either from the memoir by him inserted in the 'Biographie Universelle,' or the 'Hist. de l'Astron. au 18ième Siècle.' There are two éloges, one by Grandjean de Fouchy, the other by G. Brotier, prefixed to the 'Cœlum Australe.' As Delambre knew of these éloges, we have not thought it necessary to examine them.

La Caille was born at Rumigny, near Rosoy, in Thierache, March 15, 1713. His father, a retired military officer, was in the service of the duchess of Vendôme, and was himself attached to science, and endeavoured to cultivate the same taste in his son. He died however while the latter was at the college of Lisieux, and his son was enabled to continue his studies by the generosity of the duke of Bourbon. He chose theology as his profession; but in passing his first examination he showed so much frankness in his answer to some questions proposed by a doctor of the old school, that this examiner would have refused him his degree but for the remonstrances of the rest. This incident discouraged him, and he remained content with the title of Abbé, beyond which he never proceeded. He had previously turned his attention to astronomy under great disadvantages; and upon his renunciation of theology, Fouchy above mentioned, who relates that his knowledge of astronomy was above all comprehension in so young a person, introduced him to James Cassini, who gave him employment at the Observatory. In the following year, and in conjunction with Maraldi, he made a survey of part of the coast of France, where the talent which he showed occasioned his being employed in the verification of the arc of the meridian. This operation (in which Cassini de Thury was associated) commenced at the beginning of May, 173?, and before the end of the year he had completed the triangulation from Paris to Perpignan, had measured three bases, made the requisite astronomical observations at three stations, and had taken a prominent part in the measurement of a degree of longitude. In the winter of 1740, he extended his operations to the mountains of Auvergne, in order to test some suspicions which he had formed upon the accuracy of Picard's measurement. The result of these labours was the complete establishment of the gradual increase of the degree in going from the equator to the poles; which, though long known to be theoretically true, had not previously been confirmed by measurement. In the meanwhile La Caille had been appointed to a chair of mathematics in the Mazarin College, the duties of which he fulfilled with care, and for which he published treatises on geometry, mechanics, astronomy, and optics. He was also employed in the calculation of ephemerides, and in that of eclipses for 1800 years, published in the 'Art de Vérifier les Dates.' In 1746 an observatory was constructed for him at his college, and he began observation on a large scale. The transit instrument being then but little used in France [Cassini], he had no means of judging of its value; so that with old methods and old instruments he continued his career for fourteen years. In 1751 he made his celebrated voyage to the Cape of Good Hope, where he remained four years or something less. His object was to form a catalogue of southern stars, and up to the present time his results have been in use. He determined the places of about ten thousand stars, and grouped them in constellations; measured a degree of the meridian at the Cape, and made a survey of the Mauritius and island of Bourbon He received for his expenses and those of a clockmaker who accompanied him, all instruments included, ten thousand francs; and so accurately did he keep his accounts, that he was able to explain his expenditure to a sou; it was 9144 francs and five sous, and he insisted on returning the balance, in spite of the disinclination of the officers of the Treasury to receive it. He returned to Paris in 1754, and occupied himself in the preparation of his 'Fundamenta Astronomiæ,' for the publication of which he engaged to furnish a bookseller with almanacs for ten years. He now began to use the transit instrument, but with so much doubt of its accuracy, and consequent repetition of observations, that, according to Delambre, the secondary stars observed

by him at this time were determined with a degree of accuracy superior to that of the fundamental stars of other observatories. He also published the posthumous works of Bouguer, a small table of logarithms, and various observations. At the end of 1761 he was seized with gout, but he remained during the winter employed in his observatory, passing most nights upon cold stones in the act of observing: a fever was the consequence, and he died March 21, 1762, aged 49 years. His last act was the return of the instruments which he had borrowed and the commission of his manuscripts to his friend Maraldi.

La Caille was an astronomer whose observations will have the highest value as long as astronomy is cultivated, which cannot be said of others, his superiors in originality of discovery. Lalande said of him that he alone had made more observations than all his contemporaries put together; which Delambre states would be no exaggeration, if spoken of the twenty-seven years during which he laboured. But though his utility was much increased by his extraordinary activity, industry, and honesty, yet his reputation was still more indebted to the genius which he displayed in producing exactness out of imperfect instruments. Delambre remarks that the repeating circles of Lenoir and Reichenbach have not been able to correct the latitude of the Observatory of Paris as determined by La Caille. He also says, 'Having been called upon by singular conjunction of circumstances to go over and verify a great part of the labours of La Caille, after having reviewed with the greatest care all his stars, made long researches on refraction, constructed new solar tables, measured the meridian of France, and had in my hands for several years all the manuscripts of La Caille, I never followed him one step of his track without feeling increased admiration and esteem for a savant who will always be *the* honour of French astronomy.' Delambre is, as we have seen, a severe critic in all quarters, and never shows much, if any, national bias in great questions: an éloge from him is history.

The writings published by La Caille are as follows:—1745-1754, Ephemerides; 1746, Leçons élémentaires d'Astronomie Géom et Phys., reprinted in 1755, 1761, and in 1780, with notes by Lalande; translated into English by Robertson, 1750: his first observations, for 1743, are in the Memoirs of the Academy, which appeared in 1748: 1750, Leçons élémentaires d'Optique, a work which maintained its ground a long time, but only for want of a better: 1756, Avis aux Astronomes, &c., a pamphlet recommending the corresponding observations to be made in Europe while he was in the south: 1753, Observations made at the Cape, for parallax of Moon, Mars, and Venus: 1755-1764, Ephemerides, on the model of which, according to Lalande, our Nautical Almanac was constructed: 1757, Fundamenta Astronomiæ; among many other things this contains a catalogue of 397 stars (northern), of which Delambre says that it cost more trouble than any other catalogue ever gave its author: 1758, Tabulæ Solares, the best up to the time of Delambre and Zach.

But the first work of La Caille (according to Delambre, and omitted by Lalande) was an edition of, or commentary on, the tract of Cotes, entitled Estimatio Errorum, &c., the first attempt to apply the theory of probabilities to the determination of the most probable mean of observations. La Caille was an astronomer who made his own head supply the deficiencies of his workmen's hands.

The posthumous works of La Caille were as follows:—1765-1774, Ephemerides; containing also a catalogue of 515 zodiacal stars: 1763, Journal Historique du Voyage fait au Cap de Bonne Espérance: 1763, Cœlum Australe Stelliferum, the record of his observations in the southern hemisphere. It contains observations of more than ten thousand stars, with a catalogue of 1942 principal stars, which catalogue is also in the Memoirs of the Academy for 1752.

LA CHÂTRE. [CHATRE, LA.]

LA CONDAMINE, CHARLES MARIE, was born at Paris on the 28th of January, 1701. Upon leaving college he entered the army as a volunteer, and forthwith proceeded to take part in the siege of Rosas, where his intrepidity soon rendered him conspicuous; but on the restoration of peace, finding the expectations of promotion which he had previously entertained not likely to be realized, he quitted the military profession, and in 1730 entered the Academy of Sciences as assistant-chemist ('adjoint-chemiste'). Shortly after this he embarked in an expedition to the Mediterranean, having for its object the exploring the coasts of Asia and Africa, and while absent visited Troas, Cyprus, and Jerusalem, and passed five months at Constantinople. Upon his return to Paris the Academy were busily occupied in discussing the arrangements for a voyage to the equator for the purpose of measuring an arc of the meridian, with a view to the more accurate determination of the dimensions and figure of the earth. From the first mention of this project La Condamine directed his attention to every branch of science connected with it. 'The very desire,' says Condorcet, 'of being connected with so perilous an undertaking, made him an astronomer.' His proposals having been accepted by the Academy, who felt how much his natural zeal and courage might tend to the success of the expedition, he again (1735) took leave of his country in company with MM. Bouguer and Godin, and proceeded to Peru. The fatigue and hardships which they had to encounter till their return in 1743, and which were heightened by the discord and jealousy which rose up among them, have been already noticed. [BOUGUER.] Upon his return he published 'An Account of a Voyage up the Amazon,' 1745; and in the same year, an abridged account of his 'Travels in South America.' His work entitled 'The Figure of the Earth as determined by the Observations of MM. de la Condamine and Bouguer,' did not appear till 1749. In 1747 he proposed to his government the adoption of the length of the seconds' pendulum as an invariable unit of measure. In 1748 he was elected a Fellow of the Royal Society of London, and in 1760 a member of the Academy of Sciences of Paris. In 1763 La Condamine and Lalande formed part of the deputation appointed by the Academy to be present at the making of the Report of the Royal Society concerning the inventions of Harrison for facilitating the finding of the longitude. On the 4th of February, 1774, he died while voluntarily undergoing an experimental operation for the removal of a malady contracted in Peru. Always occupied, he appears to have needed time to feel his misfortunes, and notwithstanding his sufferings he appears never to have been unhappy. His wit, the amiability of his temper, and the celebrity of his travels, made him many friends, and his humour was generally successful in blunting the attacks of enmity. His curiosity and love of distinction urged him on in the pursuit of information, and ultimately led to his carrying on a correspondence with the learned of all nations upon almost every subject.

The principal works of La Condamine which have not already been mentioned are, 'Measure of the First Three Degrees of the Meridian in the Southern Hemisphere,' 1751; 'History of the Pyramids of Quito,' 1751; 'Journal of the Voyage to the Equator,' 1751; besides numerous scientific memoirs in the Transactions of the Academy of Sciences of Paris, and in those of the Academy of Berlin.

(Condorcet, *Eloge de La Condamine*, Paris, 1804, tome i.; Biot's *Notice of the Life of Condamine*; *Biog. Univ.*: *The Works of Condamine*; Thomson's *Hist. of the Royal Society*.)

LAC, a resinous substance, which in the East Indies flows from certain trees in the state of a milky fluid, on account of the puncture made by a small insect, the *Coccus ficus*, in their branches, in order to deposit its ova. The trees are principally the *Ficus Indica*, *Ficus religiosa*, and *Rhamnus jujuba*.

There are three kinds of lac known in commerce, and they are distinguished by the names of *stick-lac*, *seed-lac*, and *shell-lac*. Stick-lac is the substance in its natural state; it is of a reddish colour, and encrusts small twigs; when broken off and boiled in water, it loses its red colour, and is then termed *seed-lac*; and when melted and reduced to the state of thin plates, it is called *shell-lac*, which has a yellowish-brown colour. Mr. Hatchett appears to have been the first chemist who minutely examined these substances; and according to him seed-lac consists of—

Resin . . .	68·
Colouring matter .	10·
Wax . .	6·
Gluten . .	5·5
Foreign bodies .	6·5
Loss	4·
	100·

Dr. John, who has more recently examined stick-lac, gives as its composition—

Resin, insoluble in æther	66·66
Laccin	16·66
Cochinellin	3·75
Extractive	2·50
Cochinel coloured coverings of insects	2·08
Waxy tallow	1·66
Laccic acid	0·62
Yellow extract	0·41
Salts of potash, lime, iron, and earthy matter	1·66
Loss	4·
	100·

Notwithstanding the seeming accuracy of the details of the above-mentioned analyses, it would appear that further experiments are still required to determine the nature of lac; for Unverdorben has, since these analyses were published, stated the results of his examination: 1st, laccin; 2nd, red colouring matter (Cochinellin); 3rd, resin soluble in alcohol, but not in æther; 4th, resinous looking matter, slightly soluble in cold alcohol; 5th, crystallizable resin; 6th, uncrystallizable resin, soluble in alcohol and æther, but not in naphtha; 7th, wax; 8th, fat of coccus, not saponified, and some oleic and margaric acids.

Shell-lac is largely employed in the manufacture of sealing-wax; it answers this purpose better than any other resinous matter, because it melts without charring, and consequently without giving much smoke, and also because it is hard and less brittle than other resins. Shell-lac is also used in varnishes; and is so good an insulator of electricity, that a needle made of it is said to remain some days excited.

Laccin.—The properties of the substance to which this name has been given, and which remained after the lac had been repeatedly digested in alcohol and water, are, that it is hard and brittle, of a yellow colour, and slightly transparent. It is insoluble in water, but softens in it when hot; and it also swells and softens, but without dissolving, in alcohol either cold or hot; nor do æther or oils take it up. It is dissolved by concentrated sulphuric acid. Concentrated nitric acid, when heated, dissolves it slowly. Solution of potash dissolves it readily.

Laccic acid separates from solution in water, by spontaneous evaporation, in crystalline grains. It attracts moisture from the air, does not precipitate either the salts of lime or barytes, but throws down those of mercury and lead; the persalts of iron are precipitated white by it. With the alkalis and with lime it forms salts which are soluble in alcohol and in water, and are deliquescent.

Cochinellin, or the colouring matter of stick-lac, is similar to that of cochineal, is used for the same purposes, and yields a scarlet but little inferior to it.

Lac Dye and *Lac Lake*, two preparations of lac which are manufactured in the East Indies, and used to a very considerable extent in scarlet dyeing: they appear to be prepared by dissolving stick-lac in an alkali, as potash or soda, and then adding a solution of alum; by this there is precipitated a mixture of the alumina of the alum and the resinous and colouring matter of the stick-lac. The lac dye is much the more valuable of the two.

Trade.—The principal uses to which this article in its various forms is applied are for the making of sealing-wax, for varnishes, for japanning, and for scarlet dyeing. The trade in lac has of late years become of some importance. The quantities imported, re-exported, and taken for home use respectively in each of the ten years from 1828 to 1837 were as follows:—

	Imported.		Re-exported.		Consumption.	
	Lac-dye. lbs.	Shellac. lbs.	Lac-dye. lbs.	Shellac. lbs.	Lac-dye. lbs.	Shellac. lbs.
1828	694,148	497,475	48,178	352,162	430,665	343,409
1829	594,494	703,886	26,763	446,598	462,988	316,070
1830	493,050	692,458	73,773	111,820	578,061	337,185
1831	782,399	1,183,058	143,611	687,281	454,779	552,389
1832	472,976	1,332,590	71,197	772,712	603,629	404,766
1833	326,894	871,766	52,811	442,224	435,572	484,521
1834	708,959	1,032,918	88,234	533,930	393,474	486,416
1835	528,615	1,185,855	206,169	581,256	594,483	584,787
1836	663,675	1,454,355	200,975	685,300	620,248	576,332
1837	1,011,674	2,217,679	133,959	574,391	423,335	574,273

The import duty previous to 1832 was charged upon lac-dye at the rate of 5 per cent., and on shellac at the rate of 20 per cent. on the value, but in that year the rates were altered and reduced to the specific duty of 6*s*. per hundred-weight upon both descriptions. The present price of lac-dye of fine quality is from 3*s*. to 4*s*. per pound, and of shellac from 6*l*. to 6*l*. 15*s*. per hundred-weight.

LACCADIVE ISLANDS are situated in the Indian Ocean, opposite the coast of Malabar, between 10° and 13° N. lat. and 72° and 75° E. long. The inhabitants call them Lakeradeevh; deevh, in the corrupt Malabar dialect, which is spoken there, signifying island. They are seventeen in number, but only eight are inhabited, and two sand-banks are yet uncovered with vegetation. The other seven are uninhabited and overgrown with cocoa-nut trees. They are visited for the coir and nuts by boats from the other islands. The largest of these islands are Cabarettoe, Anderot or Underoo, and Akhatoe; but they are all small, Anderot, one of the largest, being only three miles in length, from east to west, and one mile broad.

These islands are based on coral reefs. The south-west monsoon is the only wind that prevails with any degree of regularity, the opposite or fine-weather monsoon being interrupted in a great measure by the proximity of the archipelago to the mainland of Hindustan. The coral-reef of Anderot projects to the north-east. The islands are low, and rise towards the centre with a slightly undulating surface. A small quantity of rice is grown in the rainy season, but it is far from being sufficient for the consumption. Besides a plant, not unlike our rhubarb, of a most acrid pungent taste, sweet potatoes are grown; but they are much inferior to those of India. The cocoa, plantain, and papau are the only cultivated fruits; others grow in a wild state, but they are not much attended to, except the betel-nut tree. Cows are the only quadrupeds on the islands; they are of small size and not numerous. There is poultry in small quantities, and the sea contains fish and turtle.

The inhabitants amount, according to an estimate, to about 6580. They resemble, in the conformation of their body and in language, the inhabitants of the coast of Malabar, and are Mohammedans. The four most considerable islands are subject to the Bebee, or petty sovereign of Cananore in Malabar, and the other four are ostensibly British. They export to Mangalore cocoa-nuts, coir, a few cowries, and a kind of coarse sugar or jaggery, made from the cocoa-nut tree: their coir is of good quality, but not well prepared. The imports consist of rice and coarse cotton-cloth. These islands have no safe anchorage. During the south-west monsoon all intercourse between them is interrupted, and their large boats are sent to the Malabar coast for shelter. (*Journal of the London Geographical Society*, vi.)

LACE. This fabric differs essentially in form and appearance from the products of an ordinary loom, and until the early part of the present century was made without the employment of machinery. The implements used by hand-lace-makers are few in number, and inartificial in their character. They consist of a pillow or cushion, a series of bobbins or small cylindrical pieces of wood round which the thread or silk employed is wound, and pins which are stuck into the cushion and around which the threads are twisted, the pattern of the lace being determined by the disposition of the pins, and this again being regulated by holes pierced in a piece of parchment which is laid upon the cushion. It is not possible to give in writing an intelligible description of the processes of lace-making by means of these implements; but it will be understood that the effect is produced by the twisting together of the threads upon the bobbins, and their being woven in among and around the pins, the pattern of the lace depending partly upon the order of arrangement preserved in these twistings and weavings, and partly upon the introduction of a thicker thread, called *gymp*, which is used for the formation of figures, flowers, and other ornaments. The principal seat of the lace manufacture in England is Buckinghamshire; but the most esteemed qualities are imported from foreign places, among which Mechlin in Belgium long maintained pre-eminence. Of late years lace-making as formerly conducted has very much declined in this country, owing to the greater cheapness of machine-made lace, better known as bobbin-net, the manufacture of which has increased beyond all expectation both in England and in France. In a memorial addressed to the Lords of the Treasury, in June, 1834, by the principal merchants and manufacturers engaged in the bobbin-net trade, it was stated that there were then employed in its various branches more than 150,000 persons, including a large proportion of young females, whose wages amounted to 2,500,000*l*. annually. The manufacture is principally carried on in and about Nottingham, Leicester, and Derby, and in the west of England, employing a fixed capital of more than 1,500,000*l*. The produce of various qualities of bobbin-net in the year 1834

is given, on the competent authority of Mr. William Felkin of Nottingham, as being equal to 27,919,063 square yards, the produce of 3545 machines. This manufacture is still only in its infancy. Improvements, both as regards the nature and quality of the fabric, and the cost at which it can be produced, are continually introduced, and there is little reason to doubt that in a comparatively short time machine-made lace will altogether take the place of that made by the hand.

LACEDÆMON, LACEDÆMONIANS. [SPARTA.]

LACE'PE'DE, BERNARD GERMAIN E'TIENNE, DE LA VILLE, COMTE DE, a celebrated French naturalist, born at Agen, chief town of the department of Lot-et-Garonne, in France, on the 26th of December, 1756. His father, Jean Joseph Médard de la Ville, held a high legal appointment (lieutenant-general of the Sénéchaussée) at Agen, and was descended from an antient and noble family. Young Lacépède lost his mother at an early age, and from a great resemblance which he bore to her he was doted on by his father, who brought him up at home, and freely allowed him to cultivate a taste which he showed for reading, by letting him have free access to a good library. He thus acquired romantic notions and a generous unsuspicious disposition, which all the changes of a long and eventful life never effaced, and which sometimes led him into error, inducing him to believe improbable circumstances rather than doubt the veracity of an author. Among other books he met with Buffon's 'Histoire Naturelle,' which he read over and over till he knew it by heart, and thus gained a taste for natural history from the works of this fascinating writer, whom he henceforth took for his master and his model. While at home he imbibed a fondness for music, in which science he became a proficient: he also applied himself with ardour to the study of physics and natural philosophy, and formed with some of his young companions a juvenile academy, many members of which became afterwards members or correspondents of the Institute. Having made some experiments on electricity, and collected, as he thought, some important facts and observations, he wrote a memoir on this subject, and sent it to Buffon, who returned him such a flattering answer, that on the reception of it he set off immediately for Paris, where Buffon then held the appointment of superintendant of the Jardin du Roi. He was at this time about twenty years old, and wished to devote himself entirely to the pursuit of science and music, but his friends insisted on his following some profession, and accordingly he obtained a commission in the army. He got attached however to a regiment where he had nothing to do, and which he hardly ever saw, though it served for a nominal employment. At this time he assiduously cultivated his musical talents, and published an opera for the stage, which though favourably received at first, was not ultimately successful, and from this time he only followed this study for his private amusement.

In 1781 he published an essay on natural and artificial electricity, and in 1782 a treatise on physics, entitled 'Physique Générale et Particulière.' These works were full of ingenious hypothesis and clever reasoning, but the theories which they contained were not based on facts, and they did not meet with success. Buffon however, on whose model they were written, was so much pleased with them that he became from this time the intimate friend and instructor of Lacépède, who was now the first and favourite pupil o Buffon and Daubenton. Buffon proposed to him to continue his 'Natural History,' and in 1785 offered him the appointment of curator and sub-demonstrator in the Cabinet du Roi. He gladly left the army and accepted it, though a laborious situation. He now applied himself with energy to natural history, and published his 'Histoire Naturelle des Quadrupèdes Ovipares et des Serpents,' in 1788-89; the last part came out after Buffon's death, which took place in 1788. Cuvier says, 'This publication, by its elegance of style, and the interesting facts it contains, was worthy of the immortal work of which it forms the continuation; it marks the change of ideas and progress of science which had taken place during the forty years which had elapsed since the "Histoire Naturelle" of Buffon first appeared.' M. Lacépède however had not the antipathy of his master to precise methods and nomenclature; he formed classes, orders, and genera, which he clearly characterized, as well as strictly defined many species; but his arrangement was, like that of Linnæus, artificial and unphilosophical, founded only on external characters, without reference to internal organization. After the death of Buffon, when France became disturbed by the national convulsions of the Revolution, Lacépède took an active part in political affairs; he was successively invited to fill the posts of president of Paris, commandant of the national guard, and deputy extraordinary for the town of Agen in the Legislative Assembly of 1791, of which he was elected president. With many others he got out of favour in the following year, and narrowly escaped destruction during the reign of terror, being obliged to secrete himself for some time. When the Jardin du Roi was converted by the Convention into a public school, and named the Museum of Natural History, he returned there, and in 1795 a new chair of zoology was created for him, in which he lectured on reptiles and fishes, with great success. In 1798 he brought out the first part of his 'Histoire Naturelle des Poissons,' which Cuvier pronounced to be a very good performance considering the disadvantages under which he laboured in getting specimens, and the imperfect knowledge of the organization of these animals at that time. In 1804 his 'Histoire Naturelle des Cétacés' was published, which he correctly estimated as the best of his writing. After this period he wrote no large work, though he contributed numerous memoirs to the 'Annales du Museum,' the 'Mémoires de l'Académie des Sciences,' and other publications. A great deal of his time was spent in public business. In 1799 he was elected a member of the senate, and was made president in 1801. From 1803 till the Restoration he filled the office of grand chancellor of the Legion of Honour. He was a member of the Institute at the time of its formation, and afterwards of the Academy of Sciences. He died on the 6th of October, 1825. Cuvier says that he was always distinguished by excessive politeness and courteousness of manner, with which however he combined great kindness of heart, and that his works show him to have been a profound observer and an elegant writer. We here subjoin the titles of his principal works, but for a complete enumeration of his literary contributions we refer to Cuvier's 'Eloges,' where a good biographical memoir of Lacépède will be found:—

'Histoire Naturelle, Générale, et Particulière, des Quadrupèdes Ovipares et des Serpents,' 2 vols. 4to., Paris, 1788-89, translated into German by Bechstein, Weimar, 1802, 8vo.; 'Histoire Naturelle, &c., des Poissons,' 5 vols. 4to., Paris, 1798, 1803, translated into German, 2 vols. 8vo., Berlin, 1804; 'Eloge Historique de Daubenton,' Paris, 1790, 8vo.; 'Histoire Naturelle, &c., des Cétacés,' Paris, 1804, 4to.

LACERTA (the Lizard), a constellation of Hevelius, surrounded by Andromeda, Cepheus, Cygnus, and Pegasus

Character.	No. in Catalogue of		Magnitude.
	Flamsteed and (Piazzi.)	Astron. Society	
a	1	2658	5
b	2	2667	5
c	3	2676	4½
d	4	2679	5
g	7	2692	4
m	(36)	2650	5

LACE'RTIADÆ, or LACERTIANS. Under the family name of *Lacertians* Cuvier arranged—

1st. The *Monitors* and their subdivisions, viz. the *Monitors properly so called*, including the *Ouarans* of the Arabs (*Varanus*), &c.; the *Dragons* (*Crocodilurus* of Spix, *Ada* of Gray); and the *Sauvegardes* (*Monitor* of Fitzinger and Ameiva).

2nd. The *Lizards* properly so called.

This second group comprises, according to Cuvier, the genera *Lacerta*, *Algyra*, and *Tachydromus*.

MM. Duméril and Bibron make the *Varanians*, or *Sauriens Platynotes* (Broad-backed Saurians), a family which comes immediately after the *Geckotians* in their *Erpétologie*. They allow that the *Varanians* are nearly allied (ont très grands rapports) to the *Lacertians*, as modified by them, and rest the distinctions of the former family from the latter—1st, on the presence in the latter of polygonal scales

which cover the head; 2nd, on the form of the scales of the back and of the belly, and their noncompressed tail; and 3rd, on the form and disposition of the teeth, which are not distant, obtuse, and conical, but placed on the same line, and trenchant at their summit in the antero-posterior direction.

As the family of the *Varanians* is highly important and interesting, and the differences between that family and the *Lacertiadæ* are not, as we have seen, very wide, it will be most instructive to treat of both in the same article, and the reader will find a compendium of the organization and natural history of each under the title VARANIDÆ.

LA'CHESIS. (Herpetology.) [VIPERIDÆ.]

LACHRYMAL ORGANS, DISEASES OF THE. The lachrymal gland is very rarely the seat of disease. It sometimes suppurates from acute inflammation, but it is more commonly affected with a chronic enlargement and induration, forming a prominent tumour under the upper eyelid, which pushes the eye downwards and inwards. In this state it may be removed without difficulty and with perfect safety from beneath the eyelid.

The most frequent disease of these organs is that commonly called fistula lachrymalis, which consists of inflammation of the lachrymal sac. [EYE.] When the inflammation is acute, it forms a tumour of about the size and shape of a horse-bean at the inner side of the eye, which is firm, red, hot, and extremely painful. The nasal duct being closed, the tears, which should pass through it into the nose, flow continually over the cheek, and produce redness and excoriation. The eyelids swell, and the pain and tension are sometimes so severe as to excite considerable fever and even delirium. If the inflammation be not early checked, suppuration takes place, and the matter may escape by an opening, which sometimes remains for a long time fistulous, at the corner of the eye. The treatment must be actively reducing, and when suppuration has taken place an early opening should be made into the sac at its most prominent part.

In the chronic inflammation of the lachrymal sac, which often succeeds to the acute, the nasal duct continuing obstructed, the sac becomes frequently distended with its secretion, and a mixture of mucous and purulent matter may be pressed out of it through the puncta lachrymalia. In some cases no other inconvenience is produced than that of the necessity of pressing out the contents of the sac once or twice a day; but in others, attacks of acute inflammation are apt to supervene, and excite very painful affections both of the lachrymal apparatus and the eye itself. In the first instance, leeches and other antiphlogistic remedies should be employed; but if they are unsuccessful, astringent lotions should be applied to the eye, that they may be imbibed by the puncta lachrymalia, and conveyed through them to the nasal duct. But if these means fail, the lachrymal sac must be punctured near the inner angle of the eye, and a probe passed through it into the nose. A portion of bougie must be introduced into the passage thus restored; the canal will enlarge around it so as to permit the tears to pass through, and after a few days the bougie may be exchanged for a nail-headed style, which must be worn in the canal and sac for a considerable time.

LACHRYMATORY, a small earthen or glass vessel, generally with a long neck, found in the sepulchres of the antients. Chifflet, in his 'Lachrymæ prisco ritu diffusæ,' first started the idea that they were intended to hold the tears of relatives or friends, who assisted at the funeral rites; and the notion was long supported by the antiquaries of different countries throughout Europe. It was afterwards combated by Schœpflin and Paciaudi, and as no such use of these phials or little bottles can be discovered in passages of the Roman writers, the conclusion has at last been come to that they were intended to contain perfumes or balms only for sprinkling upon the funeral pile. (Millin, *Dict. des Beaux-Arts*, 8vo. Par. 1806, tom. ii., p. 250; Fosbrooke, *Encycl. of Antiq.*, vol. i., p. 206.)

LACHSA, or LAHSA. [ARABIA.]

LACISTEMA'CEÆ, a small and obscure natural order of incomplete Exogenous plants, containing a few arborescent species, inhabiting the woods of tropical America, in low places. In appearance they resemble the genus Celtis; and in structure they approach very nearly to Urticaceæ, from which Von Martius first distinguished them. The principal characters on which the order is founded are the dehiscent three-valved fruit and amentaceous inflorescence. Nothing is known of their properties.



A branch of Lacistema serrulatum in flower and fruit 1, a flower with its calyx; 2, an ovary with the double stamen below it; 3, a ripe fruit.

LACO'NICA, called by the Roman writers Laconia, a country of antient Greece, was bounded on the west by Messenia, on the north by Arcadia and Argolis, and was surrounded by the sea on the eastern and southern sides. Laconica is a long narrow valley, running from north to south, and lying between two mountain masses which stretch from Arcadia to the southern extremities of the Peloponnesus: the western range, which terminated in the promontory of Tænarum, now Matâpan (36° 23′ N. lat.), the most southerly point of Greece, was called Taygetus; and the eastern, terminating in Cape Malea, was known by the names of Parnon, Thornax, and Zarex. The whole drainage of this valley is collected in the river Eurotas, which flows from the high lands of Arcadia, and is joined by the river Œnus, a little above Sparta. From its source to its junction with the Œnus the Eurotas flows through a very deep and narrow valley, which near Sparta is so much contracted as to leave room for little more than the channel of the river. After it leaves Sparta the hills recede farther from the river; but near Œnoe they again approach it for a short distance, and afterwards retire to the west and east towards the Capes of Tænarum and Malea respectively, leaving between them a plain of considerable breadth and fertility, through which the Eurotas flows to the sea. Between the mountains which form the eastern boundary of the valley of the Eurotas and the sea there was a narrow strip of land, which contained the towns of Delium, Minoa, and Epidaurus Limera, belonging to Laconica: Prasiæ, which was farther north on the same coast, belonged to Argolis. The area of Laconica was probably about 1896 square miles.

The district of Thyreatis, on the borders of Argolis, was an object of early contention between Argos and Lacedæmon. (Herod., i. 82.) It originally belonged to Argolis, but was conquered by the Spartans about 547 B.C., in whose possession it remained till the decline of Sparta, when it was recovered by Argos. In the time of Pausanias it was included in Argolis. (Paus., ii. 38, § 5.)

The snow remains on the highest points of Taygetus, in the neighbourhood of Amyclæ, to the month of June: the streams on the eastern slope of this mountain-range are abundant. The orange-tree flourishes at Mistra, near the antient Sparta, and fills the air with its perfume at a time when the summits of Taygetus are still wrapped in snow.

Colonel Leake describes the soil of Laconica as 'in general a poor mixture of white clay and stones, difficult to plough, and better suited to olives than corn' (*Morea*, i. 148). This description is in conformity to that of Euripides, who says that 'it possesses much arable land, but difficult to work' (quoted by Strabo, viii. 366). Strabo informs us that there were some valuable stone-quarries near Tænarum and in

the mountains of Taygetus (viii., p. 367); and Pausanias also speaks of the shell-fish on the coast, which produced a dye inferior only to the Tyrian. (Pausan., iii. 21, sec. 6.) Laconica was subject, in common with the southern countries of Greece, to earthquakes, the most remarkable of which occurred B.C. 462, and destroyed the whole of the city of Sparta with the exception of five houses.

Laconica is well described by Euripides as difficult of access to an enemy. (Strabo, viii. 366.) On the west the range of Taygetus formed an almost insuperable barrier to any invading force; and on the north there were only two natural passes by which the country could be entered; one by the valley of the Upper Eurotas, as the course of that river above Sparta may be termed, and the other by the valley of the Œnus. Both of these natural openings led to Sparta, which shows how admirably the capital was situated for purposes of defence. The want of good harbours on the coast also protected it from invasion by sea; and the possession of the island of Cythera, at the entrance of the Laconian Bay, which contained several good harbours, was therefore always considered by the Lacedæmonians as a point of great importance. Gythium, on the coast of the mainland, was the naval station of the Spartans.

There were no towns of any importance in Laconica, with the exception of Sparta. [SPARTA.] Strabo says that there were thirty towns in Laconica besides Sparta, but that it formerly contained a hundred (viii. 362). A brief account of all the towns of which anything is known is given in Clinton's 'Fasti Hellenici' (ii., p. 401-404). One of the most antient towns was Amyclæ, the residence of the Achæan kings, situated a little to the south of Sparta, in a fertile plain. In the time of Pausanias it had become a small place, but contained many temples and works of art (Pausan., iii. 18, sec. 5; 19, secs. 5 and 6); and its temple of Apollo is described by Polybius as superior to almost all the other temples of Laconica. (Polyb., v., p. 367; *Casaubon.*) The inhabitants of the rugged district of Sciritis, which lay to the south of Arcadia, between Tegea and the valley of the Upper Eurotas, enjoyed peculiar honors and privileges. They formed a separate body in the Spartan army, and were always stationed on the left wing. (Thucyd., v. 67; Xenoph., *Rep. Laced.*, xii. 3; *Cyrop.*, iv. 2, sec. 1.) After the invasion of Laconica, B.C. 369, they revolted from the Spartans. (Xenoph., *Hell.*, vii. 4, sec. 21.) They appear to have been of Arcadian race.

The Leleges, according to the most antient traditions of Laconica, were the earliest inhabitants. (Pausan., iii. 1, sec. 42.) Lelex, the first king, was succeeded by his son Myles, who left the kingdom to his son Eurotas. According to the same traditions Eurotas, dying without children, bequeathed the kingdom to Lacedæmon, the son of Jupiter and Taygeta, who married Sparta, the daughter of Eurotas. The sovereignty is said to have remained in his family till shortly before the Trojan war, when the descendants of Pelops, Menelaus and Agamemnon, obtained possession of the country by marrying Clytemnestra and Helen, the daughters of Tyndareus, the last monarch of the antient dynasty. At the time of the Trojan war we find the country in the possession of the Achæans, who undoubtedly settled in Laconica at a very early period, and probably conquered the Leleges. Menelaus was succeeded by Orestes, and Orestes by Tisamenus, during whose reign Peloponnesus was invaded by the Dorians.

After the conquest of the country Laconica was assigned to Aristodemus, or his sons Eurysthenes and Procles, for, according to the general tradition, Aristodemus did not live to enter Laconica. Strabo relates, on the authority of Ephorus (viii., p. 364), that Eurysthenes and Procles divided Laconica into six districts, over which they set governors with the title of kings. During the reign of Eurysthenes the conquered people were admitted to an equality of political rights with the Dorians; but his successor Agis deprived them of these privileges. The condition of the original inhabitants of the land, and their relation to their Dorian rulers, as well as the remaining history of the country, belong to the history of SPARTA.

(Strabo, lib. viii.; Pausanias, *Laconica*; Leake's *Morea*; Gell's *Itinerary of Greece*; Müller's *Dorians*; Thiersch, *De l'Etat Actuel de la Grèce*; Thirlwall's *History of Greece*.)

LACQUERING. [JAPANNING.]

LACTA'NTIUS (Lucius Coelius, or Cæcilius Firmianus Lactantius), one of the early Latin fathers, was a scholar of Arnobius, who taught rhetoric at Sicca in Africa. He lived at the end of the third and the beginning of the fourth century. His native country is uncertain, but he is generally supposed to have been an African. On the invitation of Diocletian, he went to Nicomedia, where he taught rhetoric. He became afterwards preceptor to Crispus, the son of Constantine, in Gaul. The time of his death is not satisfactorily ascertained.

His chief work is the 'Divine Institutions,' in seven books, written in reply to two heathens who wrote against Christianity at the beginning of Diocletian's persecution. The date of the composition of this work cannot be exactly fixed. Basnage, Du Pin, and others place it about A.D. 320; Cave and Lardner about A.D. 306: Lardner states the arguments on both sides in his 'Credibility;' and, on the whole, the latter opinion seems the more probable. Du Pin has given an analysis of the 'Institutions.' The other extant works of Lactantius are, an 'Epitome of the Divine Institutions;' the first five books of which were not extant in Jerome's time, but were discovered and published by Pfaff in the year 1712; a treatise on the 'Workmanship of God,' a treatise on the 'Wrath of God,' and a work entitled 'Symposion,' which he wrote when he was very young. He also wrote an 'Itinerary from Africa to Nicomedia,' a work entitled 'Grammaticus,' two books to Asclepiades, and eight books of Epistles, all of which are lost. A work on the 'Deaths of Persecutors' is ascribed to Lactantius, but its genuineness is much disputed.

The testimony to his learning, eloquence, and piety is most abundant. Le Clerc calls him the most eloquent of the Latin fathers, and Du Pin places his style almost on a level with Cicero's. Many writers however value his rhetoric more than his theology. He has been charged, among other errors, with Manichæism, from which Lardner takes great pains to defend him. Middleton has shown, in his 'Free Enquiry,' that Lactantius was not free from the credulity with which many of the early Christian writers are chargeable.

Complete editions of his works were published by Heumann at Göttingen in 1736 (the preface to this edition contains a catalogue of former editions); and by the Abbé Lenglet, 2 vols. 4to., Paris, 1748.

(Hieronymus, *De Viris Illust.*, c. 80; Eusebii *Chronicon*, p. 180; Du Pin's *Ecclesiastical History*, vol. i., cent. 3; Lardner's *Credibility*, vol. iii., p. 481, edit. of 1831.)

LACTEALS (from *lac*, milk) are so called from their containing an opaque white milky fluid. They are the system of vessels by which the chyle, or nutritive part of the food, is conveyed from the intestines to the left sub clavian vein, in which it is mixed with the blood. They have their origin in the villi of the small intestines, which are short hair-like processes, each consisting of a fine network of lacteal vessels surrounded by capillary arteries and veins. From the villi the chyle is carried, between the layers of the mesentery, through numberless converging branches, to the thoracic duct, the main trunk of the absorbent system, which, at the part where the chief lacteal branches join it, is dilated into what is called the receptaculum chyli. The villi have no visible apertures for the entrance of the chyle, but the walls of the lacteal vessels themselves are extremely thin and permeable, and their canals are furnished with numerous and delicate valves, like those of the veins [CIRCULATION], to prevent the fluid which they contain from descending again to their absorbing extremities. In their passage through the mesentery the lacteals traverse numerous mesenteric absorbent glands [GLAND], where they communicate with veins, and the fluid contained in them is exposed to the influence of the blood, from which it acquires colouring matter and fibrine.

The villi being set so densely on the lining membrane of the small intestines that their summits form a smooth surface like that of the pile of velvet, the whole of this part of the intestinal canal presents a continuous surface for the absorption of nutriment. The power by which this absorption and the ascent of the chyle in the lacteal vessels is effected is unknown; but its nature is probably analogous to that by which the absorption and ascent of the nutritive fluids in the plant are governed. In this part of their physiology indeed the higher animals and vegetables present remarkable analogies; the extremities of the lacteals corresponding to the spongioles on the roots of plants, and their branches to the vessels of the wood through which the sap

is conveyed to be exposed in the leaves to the influence of the air, as the chyle (after being mixed with the blood) is exposed to the same influence in the lungs. The absorption of the chyle however seems to be more purely a vital process; for while the spongioles absorb whatever is presented to them in a fluid form, the lacteals in the villi remove, from the heterogeneous mass which is presented to them in the intestinal canal, only that which is adapted to the nutrition of the body.

The lacteals are the system of vessels upon which the body depends primarily for its support. Their obstruction, which occurs to a greater or less extent in the diseases of the mesenteric glands, or from injury to the thoracic duct, causes a gradual emaciation, which, if its cause be not removed, is slowly but certainly fatal. For further information on the various processes to which they are accessory, see the articles ABSORBENTS, CHYLE, DIGESTION, DUODENUM, INTESTINES.

LACTIC ACID. This substance exists in milk, and in larger proportion when it has become sour; it was first recognised as a peculiar acid by Scheele, but he did not obtain it perfectly pure. It was afterwards observed by Berzelius in many animal fluids; and by Braconnet to exist with acetic acid in fermented rice-meal, wheat-paste, the juice of the beet-root, and other vegetable substances. It has by several chemists been suspected to be a compound of acetic acid and organic matter. Supposing it to be a peculiar acid, Braconnet called it *Nanceic acid*, from Nancy, the town in which he lives; and it has also been termed *zumic acid*, from *zyme* (ζυμή), *leaven*. The acid of *sauerkraut* is also the lactic. MM. Pelouze and Jules Gay-Lussac obtained lactic acid by the following process:—Expose the juice of beet-root to a temperature between 77° and 86°; fermentation commences after some days, and continues for two months; the juice, after the fermentation has ceased, is evaporated to the consistence of a syrup, during which crystals of *mannite* separate, and common sugar is also present. The syrup is then digested with alcohol, which dissolves the lactic acid; to this water is added, and when the alcohol is distilled off, precipitation of impurities takes place. The solution of lactic acid is converted into lactate of zinc by adding the carbonate; and the solution of lactate of zinc is filtered and crystallized, which is purified by again dissolving in water and treatment with animal charcoal; the lactate of zinc is then decomposed by barytes, and the lactate of barytes by sulphuric acid, which precipitates sulphate of barytes, while the lactic acid remains in solution. Sour milk treated in the same way also gives lactic acid: the aqueous solution of the acid may be concentrated in vacuo, and rendered quite pure by solution in æther, which leaves a little flocculent matter undissolved. Lactic acid is colourless, inodorous, very sour, and may be so concentrated as to have a specific gravity of 1·215: it attracts moisture from the air, and dissolves in water and alcohol in all proportions. When heated with nitric acid it is converted into oxalic acid. When added to boiling milk it is capable of immediately coagulating about 700 times its weight; but when cold it produces comparatively little effect upon it: it also coagulates albumen.

When added to a strong solution of acetate of magnesia, granular lactate of magnesia is precipitated; but it gives no precipitate with lime, barytes, or strontia-water.

When the most concentrated lactic acid is heated gradually, it becomes more fluid, darker coloured, and yields acetic acid and inflammable gas, charcoal, and a white solid matter, which is both sour and bitter: when this is dried between folds of bibulous paper, and afterwards dissolved in alcohol, it yields perfectly white rhombic crystals, which are anhydrous lactic acid; they are fusible at 225°, and volatile at 472°, the vapour again crystallizing on condensation: when dissolved in water the solution has all the properties of that from which the crystals were obtained.

The crystals consist of—

Four equivalents of	hydrogen	4	or	5·6
Six ,, ,,	carbon	36		50·
Four ,, ,,	oxygen	32		44·4
Equivalent	. .	72		100·

In the driest lactates however it is always combined with one equivalent of water.

The lactates are not an important class of salts, and we shall therefore mention the general properties of only a few of them. The following are all soluble in water, but many of them are uncrystallizable:—lactate of ammonia, deliquescent and uncrystallizable; lactate of potash and of soda, deliquescent, soluble in alcohol, and, by evaporation in vacuo, they become crystalline masses. Lactate of lime and of barytes yield gum-like products: the lactates of alumina, peroxide of iron, and copper, do not crystallize; but that of magnesia and lactate of zinc crystallize in quadrilateral prisms, and that of silver in colourless needles.

LACTUCA'RICUM is obtained from the Lactuca Virosa, being the inspissated milky juice of the plant, and which is at first white, but afterwards by exposure to the air and sun concretes and becomes brownish. The juice of the leaves only should be collected before the flowering has begun: puncturing the leaves is the best mode of procuring it.

Other plants often mistaken for it: Lactuca sativa (Thridace, very inferior), L. angustana, L. quercina, L. scariola, Sonchus oleraceus, and Dipsacus sylvestris. According to Klink, it contains lactucic acid. It yields by distillation its odour and taste to water, which thus acquires some of the virtues of the plant. The inspissated concrete juice resembles opium in its action, but is much feebler; nevertheless it suits some constitutions better. In pulmonary diseases it is often a useful sedative. The common garden lactuca also possesses sedative properties, and eaten towards bedtime has often contributed to procure rest in cases of morbid vigilance, or to allay pains of the stomach.

LACTUCIC ACID, discovered by Pfaff in the juice of the *lactuca virosa*. When acetate of lead was added to the clear juice, lactucate of lead was precipitated, which was washed and decomposed by hydrosulphuric acid: the filtered liquor, when evaporated, yielded crystals of lactucic acid, which are very strongly acid, and greatly resemble oxalic acid; but they differ from it by giving a green precipitate when added to the neutral protosalts of iron, and a brown precipitate with sulphate of copper; with magnesia this acid forms a soluble salt. It has not been minutely examined, nor has it been analyzed.

LACU'NA. [TROCHIDÆ.]

LADAKH is a kingdom in Asia, situated to the east of Cashmere, from which it is separated by that branch of the Himalaya Mountains which is called the Tibet Panjahl range. According to Moorcroft its area is equal to half that of England. It has the figure of a triangle, whose longest side runs from Bissahir [HIMALAYA] along the mountain-range to Cashmere. North of it lie Baltistan, or Little Tibet, and Khotan in the Chinese province of Thians-han Nanlu. From the last-mentioned country it is divided by the nearly unknown mountain-chains of Kuenluen and Kara-korum. East of it is Chang-tang, a province belonging to Tibet.

Ladakh is a part of the elevated table-land which is supported by the Himalaya system, and divided by it from the low plains of the Ganges and Indus. Its elevation above the sea is not known, but it can hardly be less than 9000 feet. Though it does not appear that any of the mountains within its boundaries rise to a great height above this elevated base, its surface is a continual succession of ascents and descents, many of which are very steep. Through the middle of the country runs the valley of the river Indus, here called Sing-ke-tse. This river, after passing Gertope, enters Ladakh at its southern extremity, where its valley is upwards of two miles wide. It continues to be wide as far as Roodok, a considerable distance above Leh, the capital of the country. At Roodok the high land comes up to the bed of the river, which rushes on with great impetuosity until it issues forth into the plain on which Leh is built. The plain is extensive and well peopled, but the country bordering it on the north is unknown.

The Indus, which traverses the country in a north-north-western direction, receives here several considerable tributaries, of which the Shayuk, the most important, joins the Indus below Leh. There are several lakes in this country, most of which are salt, and furnish great quantities of that article. The largest of these lakes is that of Chimorerel, which is from 20 to 25 miles long, with a width of 8 or 10 miles.

As the surface of the country is so elevated above the sea, its climate and productions do not correspond to its latitude (30° to 35°). The whole country is covered with snow in winter, and most of the mountains are so even in the month of June. The winters are long and severe, and all the rivers are covered with ice, which facilitates travelling

in this season, just as in the northern countries of Europe. The people are mostly clad in sheep-skins and fur, as in Russia. The summers are hot and dry. Rain does not appear to be frequent.

The plain about Leh, though of moderate fertility, is well cultivated, which is the case with other districts of less extent. Moorcroft thinks that our agriculturists might learn something from the inhabitants of Ladakh. No rice is cultivated: wheat, barley, and lucerne are grown to a great amount. In some districts a kind of barley is raised which resembles wheat; in others cotton is cultivated in small quantities. Turnips are grown very extensively. Wood is scarce: poplars and some other trees are planted in the lower tracts.

The pastures occupy a large part of the country. The cattle are small and of three different kinds, common cattle, chowry-tailed cattle, and a third kind called *tho*, a bastard breed between the two former. Asses are rather numerous, as well as goats, which also live in a wild state. But the goat which yields the material of the shawls is not found in the country. Sheep are numerous, and among them there is a small race called the *purick-sheep*, which produces excellent wool. Horses are pretty common. On the uncultivated plains a species of wild horse is found, called by Moorcroft *Equus Kiang*. Among the domestic animals is the dog, which is large and strong. The animal from which musk is obtained is abundant in the mountains.

The sands of most of the rivers which fall into the Indus contain small particles of gold, that are collected in several places. Other metals are not mentioned. Saltpetre and sulphur also are found, and supply materials for gunpowder, which is made in considerable quantities.

Leh, or Lei, the capital of the country, contains 700, or, according to Moorcroft, 1000 houses, each several stories high and substantially built. There are several bazaars, each containing from twelve to fourteen shops. Leh is a place of great trade, being the principal entrepôt for the shawl-wool, and three great fairs are annually held here, of which that in February is the most frequented. These fairs are attended by merchants from Yerkand, in the Chinese province of Thian Shan Nalu, from L'Hassa and other parts of Tibet, from Amritsir and other towns of the Panjab, and particularly from Cashmere. Roodok, on the right bank of the Indus, but higher up the river, is another place of considerable traffic. It is said to contain 300 families, and is chiefly connected with Hindustan by the way of Kunawar in Bissahir. [HIMALAYA.]

The inhabitants of Ladakh belong to the same race as the inhabitants of Tibet. They are a very industrious and frugal people, and well acquainted with the arts of civilized life. Their country being surrounded by mountains, they have preserved their independence, though on all sides bordering on neighbours much more powerful than themselves. Their sovereign, who resides at Leh, is called *Gealbo, i.e.* Rajah of Leh. He sends however from time to time presents to his neighbours, because his subjects are connected with their countries by commerce. Ladakh, being situated between Hindustan, Cashmere, Khotan, and Tibet, is the thoroughfare of a very extensive commerce. The commercial routes are few. That to Tibet runs from Leh to Roodok, and thence to Gertope along the Indus; from Gertope it seems to cross mountain-ranges to L'Hassa. From Roodok the road to Kunawar traverses a table-land, and then descends to the Paruti river, a tributary of the Spiti, which falls into the Sutlej. Kunawar is that country which occupies the tract where these three rivers join. The road from Leh to Cashmere and the Panjab leads westward over the Tibet Panjahl Mountains by the elevated mountain-pass of Naubeck Nai Mallik. Ladakh is called Tibet by the Cashmerians. The road from Leh to Yerkand is by far the most difficult and dangerous: it crosses the high mountain-range of Karakorum and the whole mountain-system of the Kuenluen, and traverses wide mountain-tracts which are nearly uninhabited.

The principal object of this extensive commerce is the wool of the goats, which is used in the manufacture of shawls. It is brought from Gertope to Leh, and thence conveyed to Cashmere and the Panjab; eight hundred horse-loads are said to be carried annually by this route. We are not acquainted with the articles which are given in return, and have only some accounts of those which are sent to and received from Kunawar. The merchants of Kunawar bring to Roodok sugar, tobacco, cotton-cloth, cloth, indigo, swords, copper, tin, iron, paper, rice, and spices: they take in return salt, borax, gold-dust, tea, and shawl-wool. (Moorcroft, in the *Transactions of the Asiatic Society*, in the *Journal of the London Geographical Society*, and in the *Asiatic Journal*; Hügel, in the *Journal of the London Geogr. Society*; Ritter's *Erkunde*, ii.)

LA'DANUM, sometimes written *Labdanum*, but incorrectly, as it is the *lêdanum* (λήδανον) of the Greeks, and the *ladun* of the Arabs. It is first mentioned by Herodotus (iii. 112) as procured in Arabia, and used by the Arabs for fumigation: the word is not Greek, but an Arabic word with a Greek termination; the Greeks also used the word *ledus* (λῆδος) to indicate the shrub which produced the ladanum. This gum resin is produced by several species of Cistus, the *kistos* (κίστος) of Dioscorides, though the name and description are often confounded with those of the *kissus* (κισσός), or Hedera. *C. ladaniferus, creticus, laurifolius*, and *C. Ledon*, Lam., are usually mentioned as the species which are indigenous in the Grecian Islands, in Spain, Italy and the south of France. That obtained from the Levant is the most celebrated. The juice exudes upon the leaves and branches of these shrubs, and is collected, according to Tournefort, by means of an instrument resembling a rake, with leather thongs instead of teeth, which is drawn over the plant; and as the juice adheres to the thongs, it is afterwards separated. Ladanum is also described by Dioscorides as being collected from the beards of goats which had been feeding on the leaves of Cistus. (Compare Herodot., iii. 112.) It is now seldom employed for any purpose, as it is with difficulty obtained of a sufficient degree of purity from the adulterations to which it is subjected, one analysis yielding 72 parts of ferruginous sand, and another 86 of resin, out of 100 parts. The purest kind, seen only in the places where it is produced, is described as blackish, homogeneous, and tenacious, easily softening under the fingers, and even sticking to them; having a greyish fracture, which however becomes black by exposure to the air; rather a bitter taste, and a very agreeable smell from the presence of a volatile oil. It was formerly employed as a stimulant, more recently as an expectorant, and is esteemed even in the present day by the Turks as a perfume, and used for fumigation.

LADOGA, LAKE. [RUSSIA.]

LADRONE ISLANDS, so called from the thievish disposition of the natives at the time of their discovery by Magalhaens (1521), are also called Mariane Islands, in honour of the queen of Philip IV. of Spain, who caused them to be settled. They extend in a northern and southern direction between 13° and 20° 30′ N. lat., and between 144° and 145° 30′ E. long., and are about twenty in number. They are mostly of a volcanic character, and even in modern times some of the volcanoes have been in activity. Like other islands of this description, their surface is broken, and rises to high hills and even to mountains. But the soil, wherever it can be cultivated, is of great fertility. Being exposed to the trade-winds, the climate is not so hot as might be expected from their geographical position. Nearly every kind of intertropical product thrives on these islands, which produce cotton, rice, indigo, Indian corn, sugar, cacao, cocoa-nuts, tobacco, plantains, &c. in abundance. The Spaniards have introduced most of these products, as well as the llama, from Peru, which is said to thrive on the mountains. Cattle, horses, mules, and asses are numerous. The sea abounds in fish, and also produces tripang (Holothuria) for the Chinese market. The principal island is Guajan, which is about 80 miles in circumference, and according to Kotzebue, who has given the latest account of these islands, it is the only one which is inhabited at present. Its capital and the seat of the Spanish governor is S. Ygnacio de Agaña, which in 1816 contained 3118 inhabitants. It has only an open roadstead, defended by two small fortresses; but about 10 miles farther south there is a good harbour, called Calderona de Apura, which is also fortified. Of the other islands, Tinian has obtained some notoriety from the stay there of our distinguished seaman Anson, and from the extensive ruins which indicate that these islands were once inhabited by a people well acquainted with the arts of civilization. The aboriginal inhabitants, who at the time of the foundation of the Spanish settlement, in the middle of the seventeenth century, are stated to have amounted to 150,000, have nearly disappeared on Guajan, only one family of them existing in 1816, but probably they are more numerous on some of the other islands, which are only no-

minally dependent on the Spanish governor. The present population of Guajan, which in 1816 amounted to 5389 souls, consists of settlers from Mexico and the Philippine Islands, who are called by the Spaniards Los Indios; they speak Spanish, and are Catholic Christians. The number of Spaniards is very small.

(Anson's *Voyage round the World;* Otto von Kotzebue's *Voyage round the World.*)

LAEKEN. [BRUSSELS.]

LÆMODI'PODA, Latreille's fourth order of *Crustaceans*, placed by him between the *Amphipoda* and the *Isopoda*. He describes them as being the only forms among the *Malacostracans* with sessile eyes (*Edriophthalmians**) whose posterior extremity does not present distinct branchiæ, and which have hardly any tail, the two last feet being inserted at that end, or the segment to which they are attached being followed by not more than one or two other joints, which are very small. They are also, he states, the only ones in which the two anterior feet (which agree with the second jaw-feet) make a part of the head.

The *Læmodipoda* of Latreille have all four setaceous antennæ carried upon a peduncle of three joints, mandibles without palps, a vesicular body at the base of four pair of the feet at least, beginning with the second or third pair, reckoning those of the head. The body, which is most frequently filiform or linear, is composed (reckoning the head) of from eight to nine joints, with some small appendages, in form of tubercles, at its posterior and inferior extremity. The feet are terminated by a strong hook. The four anterior feet, of which the second are the greatest, are always terminated by a monodactylous claw. In many the four succeeding feet are shortened, less articulated, without any hook at the end, or rudimentary, and not at all fit for ordinary use.

Reproduction.—The females carry their eggs under the second and third segments of the body, in a pouch formed by approximated scales.

Habits and supposed place in the System.—The *Læmodipoda* are marine, and Savigny considers them as approaching the *Pycnogonids*, and making, with that form, the passage from the *Crustaceans* to the *Arachnids*.

Latreille brought the forms under one genus, *Cyamus*, with the following subdivisions and subgeneric appellations.

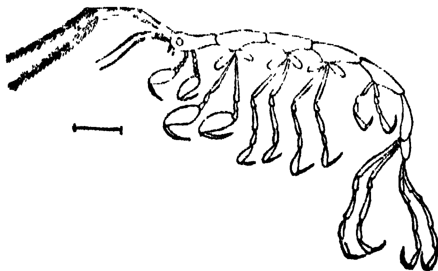
1. Filiformia. (Latr.)

Body long and very slender, or linear, with longitudinal segments; *feet* similarly elongated and slight; stem of the *antennæ* composed of many small joints.

Leptomera, Latr. (Proto, Leach).—*Feet* fourteen (reckoning the two annexed to the head), complete, and in a continuous series. (Latr.)

In the *Leptomeræ* (*Gammarus pedatus*, Mull.,'Zool. Dan.') all the feet, with the exception of the two anterior ones, have a vesicular body at their base. In the *Proto* of Leach (*Cancer pedatus*, Montag., *Trans. Linn. Soc.*, ii.) these appendages are peculiar to the second feet and the four succeeding ones.

Example, *Leptomera pedata.*



Leptomera pedata (magnified).

Naupredia, Latr.—*Feet* ten, in a continued series; the second and two succeeding pairs have a vesicular body at their base.

Locality, Coasts of Europe, France, &c.

Caprella, Lam.—*Feet* ten, but in an interrupted series, commencing with the second segment (inclusive), and not reckoning the head. This segment and the following one have each two vesicular bodies, and are totally deprived of feet.

Locality, Northern and Temperate European oceans.

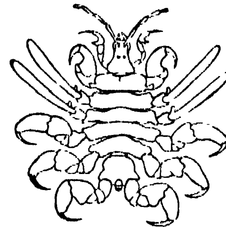
Habits.—The Læmodipods of this section keep among the marine plants and sponges, and walk like caterpillars, turn frequently with rapidity on themselves, or set up their bodies, vibrating their antennæ at the same time. In swimming they curve the extremity of the body.

2. Ovalia. (Latr.)

In this subdivision the *body* is oval, with transverse segments. The stem of the *antennæ* appears to be inarticulated. The *feet* are short, or have but little length; those of the second and third segments are imperfect, and terminated by a long cylindrical joint without hooks; at their base they have an elongated vesicular body. These Læmodipods form the subgenus

Cyamus, Latr. (Larunda, Leach.)

M. Latreille states that he has seen three species, all of which live on *Cetacea*, and the most known of which, *Cyamus Ceti* (*Oniscus Ceti*, Linn.; *Squilla*, Degeer; *Pycnogonum*, Fabr. and Sav.), is found also on the *Mackerel*. The fishermen term it the whale-louse, *Pou de la baleine*. Another species, very analogous to the first, was brought back by Delalande from his voyage to the Cape of Good Hope. The third and much the smallest is found on the Cetaceans of the East Indian seas. (Latr.)



Cyamus Ceti (magnified).

M. Desmarest gives the Læmodipods the same position as M. Latreille, and divides them also into two sections. The first, consisting of *Leptomera*, Latr. and Lam. (*Proto*, Leach; *Caprella*, Lam.); the second of *Cyamus* (*Cyamus*, Latr., Lam.; *Panope*, Leach; *Larunda*, Leach).

M. Desmarest remarks that M. Latreille never saw the *Leptomeræ* themselves, and that he has separated them from *Caprella* and *Proto* from published figures only.

M. Milne Edwards makes his *Legion* of *Edriophthalmians* comprise the *Amphipods*, *Isopods*, and *Læmipods*.

LAENNEC, RENE' THEOPHILE HYACINTHE, was born at Quimper, in Lower Brittany, in 1781. The first part of his medical education was conducted by his uncle, Dr. Laennec, a physician of repute at Nantes, and in 1800 he went to Paris, where he attended the several medical courses, and attached himself to the Hôpital de la Charité, of which Corvisart was the chief physician. In 1814 he took the degree of doctor of medicine, being already distinguished as well for his literary acquirements as for his professional industry and talent. In the same year he became chief editor of the 'Journal de Medicine,' to which he had communicated several excellent papers, both on healthy and morbid anatomy. Having obtained considerable reputation, both in private practice and by his lectures and writings, he was appointed, in 1816, chief physician to the Hôpital Necker, and it was there that he soon after made the remarkable and important discovery of mediate auscultation. [AUSCULTATION.] From this time he devoted himself unceasingly to the perfecting of his new system of diagnosis. In June, 1818, he read his first memoir on it to the Academy of Sciences, and in the following year he published his 'Traité de l'Auscultation Médiate.' But the labour necessary for its accomplishment so injured his health, which was naturally very delicate, that he was immediately afterwards obliged to resign all his studies as well as a large private practice, and to leave Paris for his native province. He returned in 1821, with his health restored, and having resumed his duties, he was soon after appointed professor of medicine in the College of France. In 1822 he was chosen professor of clinical medicine, and he regularly delivered the lectures at La Charité till 1826, when, after the publication of a second edition of his work, his health again failed him. Indications of consumption were discovered by means of the art he had himself in-

* Or, more properly, Hedriophthalmians.

vented; and although by retiring to Brittany he seemed again for a time recruited, he died of consumption in the same year.

Laennec's work on mediate auscultation is undoubtedly the most important which the present century has produced in medical science. But it must be remembered that only a small portion of his high reputation is due to the discovery of the stethoscope, although from the tone of his work it is evident that he rested chiefly upon that as the basis of his future fame. He, with many of Corvisart's pupils, had long been in the habit not only of using percussion as a means of diagnosis, but of applying the ear directly to the chest: the stethoscope was merely a convenient auxiliary for the accomplishment of the same purpose which they had in view, but so little essential that many of the best physicians now employ it only when the direct application of the ear is personally inconvenient. Had the stethoscope been invented by any one of less genius and fitness for the study of diseases than Laennec, it would probably have fallen into the same neglect as the more original discovery of the value of percussion by Avenbrugger had till his work was translated and his practice imitated by Corvisart. The invention however of a convenient auxiliary was the fortunate means of leading Laennec to apply himself to the special study of the diseases of the chest; and he so far elucidated their pathology that those diseases, which at the beginning of this century were involved in the greatest obscurity, are now the most completely and clearly known of all which fall within the province of the physician, who now studies them with the ear with almost as great accuracy and confidence as the surgeon can investigate the diseases of which he takes charge, with the eye or the hand.

Laennec's other publications, though thrown into the shade by his great work, fully maintain his reputation. The chief of them are published in the 'Dictionnaire des Sciences Médicales,' in the articles 'Anatomie Pathologique,' 'Ascarides,' 'Cartilages Accidentels,' 'Dégénération,' 'Désorganization,' 'Detrachyceros,' 'Encephaloide,' 'Filaire.'

A Life of Laennec by Dr. Forbes is prefixed to his Translation of the 'Traité de l'Auscultation Médiate.'

LAER, P. VAN. [BAMBOCCIO.]

LA FAYETTE. [FAYETTE, LA.]

LA FONTAINE. [FONTAINE, LA.]

LAGA'NA, the name used by De Blainville for a group of Echinodermata, included in Lamarck's genus Scutella. [ECHINODERMATA.]

LAGERSTRŒ'MIA, a genus of plants of the natural family of Lythraceæ, which extends from the Malayan Archipelago into China and Japan, as well as along the foot of the Himalayan Mountains to the northern parts of India. The genus was named by Linnæus in honour of Lagerstrœm, who was director of the Swedish East India Company and imported many interesting plants from India and China. The species are few in number, but most of them highly ornamental in nature. *L. Reginæ* especially forms a small tree and is conspicuous from its large rose-coloured flowers, of which the petals, standing out on rather long claws, more fully display the varied outline of its undulated limb. *L. Indica* and *parviflora* are small and shrub-like, and suited to our hothouses, but all require moisture in the season of flowering.

LAGNY, THOMAS FAUTET DE, a French mathematician, was born at Lyon in 1660, and died at Paris, 12th April, 1734. At an early period his scientific attainments led to his being appointed hydrographer royal at Rochefort. Subsequently he became sub-director of the general bank of Paris, and lost the principal part of his fortune by the failure of that establishment. His mathematical labours appear to have been in a great measure directed to objects of mere curiosity; as an instance of which he occupied himself with the quadrature of the circle, and computed the ratio of the circumference to the diameter, as far as 120 decimal places, a degree of approximation which could never be of any practical utility. He however has called forth the eulogium of Fontenelle, who, speaking of his treatise on the 'Cubature of the Sphere,' says, 'it is a choice and singular production which only a great mathematician could have written.' His methods of facilitating the solution of indeterminate problems are ingenious, and the theorems which he added to the arithmetic of sines are important. He was elected member of the Royal Academy of Paris in 1696; associate-geometrician in 1699; veteran pensioner in 1723; and fellow of the Royal Society of London in 1718. The following is a list of his published works:—'New Method of Extracting and Approximating to the Roots of Quadratic and Cubic Equations,' Paris, 1691-2; 'Elements of Arithmetic and Algebra,' Paris, 1697; 'Cubature of the Sphere,' La Rochelle, 1702; 'Binary System of Arithmetic,' Rochefort, 1703; 'Analysis of the New Methods of Resolving Problems,' Paris, 1733; besides numerous memoirs in the Transactions of the Royal Academy from the year 1733 to the year 1729.

(Thomson's *History of the Royal Society*; *Dictionnaire Bibliographique de* Quérard; Hutton's *Mathematical Dictionary*, &c.)

LA'GO MAGGIO'RE (Lacus Verbánus, and, in German, Langensee), the largest lake in Italy, extends about 40 miles in length from north to south: its greatest breadth, which is eight miles, is about the middle of its length; but it is only between two and three miles broad in most other places, and still less at the north and south extremities. The elevation of its surface above the sea is 678 feet, and its greatest depth is 1100 feet. Its northern half extends between the lower offsets of the Pennine Alps on one side and the Rhætian Alps on the other, receiving all the streams that flow from the southern slope of those mountains, from Mount Rosa on the west to Mount Bernardin on the east. The southern extremity of the lake touches the level plain of Lombardy. The principal affluents of the Lago Maggiore are:—the Toccia, or Tosa, which comes from the Val d'Ossola; the Maggia, which flows through the valley of that name; the Ticino, or Tessin, coming from the St. Gothard; and the Tresa, which flows out of the neighbouring lake of the Lugano. It also receives an outlet from the small lake of Orta, which lies west of the Lago Maggiore. The outlet of the Lago Maggiore is formed by the Ticino, which issues from its southern extremity at the town of Sesto. The northern extremity of the Lago Maggiore, which is called at that end the Lake of Locarno, extends into the Swiss canton of Ticino. Through the remainder of its length the Lago Maggiore divides Austrian Lombardy on its eastern bank from the Sardinian territory which lies along its western shore. The Ticino continues to mark the boundary between the two states to its junction with the Po. The principal towns along the banks of the lake are:—Intra, Palanza, and Arona, on the Sardinian coast; Locarno and Magadino, on the Swiss coast; and Laveno and Sesto, on the Austrian shore. For a description of the fine country around this lake see ARONA, COMO, NOVARA, TICINO.

About the middle of the length of the lake, and in its broadest part, where it forms a gulf indenting the western shore, are the Borromean Islands, 'Isole Borromée,' which belong to the noble Milanese family of the same name. They are four in number, Isola Madre, Isola Bella, Isola dei Pescatori, and the Isolino, the smallest of all. The Isola Madre, which is the largest, is covered with laurel, pine, and cypress trees, forming a grove rising in the midst of the water, and contrasting by its perpetual verdure with the snows of the neighbouring Alps. The Isola Bella is richer, but its beauty is more artificial. Numerous terraces rising in a pyramidical form are planted with orange and lemon trees, and adorned with marble statues and vases. The splendid palace of the owners is rich in marble, gilding, and mirrors, and the lower apartments are shaped like grottoes and embellished with statues and fountains. The myrtle, the rose, the vine, and the fig-tree, thrive luxuriantly around. The whole has an air of enchantment, but art is too apparent, and the lovers of nature prefer the more simple beauty of the Isola Madre. The Isola dei Pescatori is inhabited chiefly by fishermen, and has nothing remarkable; neither has the Isolino.

The Lago Maggiore abounds with fish, and a considerable trade is carried on in boats between the various points of its coast. A steam-boat, Il Verbano, plies on this lake. The Simplon road follows its western bank from Feriolo, which is opposite the Borromean Islands, to Arona. (Amoretti, *Viaggio ai Tre Laghi*, and the numerous Italian tourists.)

LAGOON, or LAGUNE. Lagoons are sheets of water formed either by the encroachments of rivers or seas upon the land, or by the separation of a portion of the sea by the intervention of a bank. Thus there are fluvial and marine lagoons. When the land on either side of a river's

course is lower than the immediate banks of the stream, and the river, in the season of the floods, either overflows its banks or in part breaks them down, the water inundates the low land; and if on the subsidence of the flood the water again flows back into the channel, the lagoon is merely temporary, and is simply an inundation. This, according to circumstances, may be a benefit to the country or a disaster. Inundations are a benefit when they bring with them and deposit a rich vegetable humus, which, on being cultivated, yields abundant crops; to such deposits Lower Egypt owes its great fertility. Inundations of this kind either diminish or increase annually, for, by repeated deposits, the soil becomes raised; and unless the bed of the river rise in proportion, the water is eventually kept within its channel; but if, on the contrary, the bed rise, the inundation gains every year in extent of surface what it loses in depth of water. Should the inundation however, instead of a prolific mud, bring nothing but sand and stones, then, as has been frequently experienced in Italy, the inundations are a cruel disaster, for they condemn rich lands to eternal barrenness and sterility. If the configuration of the land and other circumstances prevent the water of the inundated parts from flowing back on the subsidence of the flood, then a permanent lagoon is formed, and the land thus laid under water can only be recovered at a great expense, even if that be possible. These lagoons are generally fatal to the neighbourhood, for the water in them, being stagnant, gives rise to unwholesome miasmata, producing agues and other malignant disorders. Such lagoons are not absolutely confined to the lower parts of water-courses, though it is in such places that they are most frequently met with. Fluvial lagoons are sometimes formed by infiltration; a remarkable instance of which is the marshy lagoon of Ybera, on the Parana, in South America.

Marine lagoons are much more common than those on the borders of rivers. They are formed sometimes by the encroachments of the sea, and sometimes by the throwing up of a bar or bank, which eventually divides off a portion of the sea altogether, or leaves merely a small opening. In Europe there are many marine lagoons: the Adriatic, on its north and north-western parts particularly, is full of them. The Zuyder Zee with the Sea of Haarlem is a vast lagoon. There are also two very large ones known by the names of the Frische Haff and the Curische Haff, at the south-east angle of the Baltic Sea. In the Sea of Azoff there is the Sivasch or Putrid Sea. On the east coast of South America there are some very large lagoons, and they abound at the bottom of the Mexican Gulf. Marine lagoons can never be useful unless when sufficiently large and deep to admit of being navigated, in which case they form secure harbours. When shallow, they give out fœtid exhalations like fluvial lagoons, as is too well known in Venice, which is built on the 60 islands of the lagoon at the extremity of the gulf; though in this case much of the evil arises undoubtedly from the circumstance of the lagoon being the receptacle of all the filth of the city.

LA'GOMYS. [LEPORIDÆ.]

LA'GOPUS. [TETRAONIDÆ.]

LAGOS is a river in that part of Guinea which is called the Slave Coast. It rises on the southern declivities of the Kong Mountains, near 3° N. lat., and runs in a south-south-eastern direction until it approaches the sea, where in the low and level country it divides into two branches, of which the eastern, flowing parallel to the shore for about 12 miles, falls into the sea near 4° 12′ N. lat. The western also runs along the shore of the Gulf of Guinea at a few miles distance from the sea, and according to Bowdich it traverses the low country as far west as the Rio Volta (0° of Greenwich), with which it unites its waters near its mouth. But in this long course there are several channels, by some of which the river always communicates with the sea, and by others only during the rainy season. On one of these channels Badagry is situated. The length of the river, not including the western branch, probably does not exceed 150 miles. It is navigable to a considerable distance from the sea.

LAGO'STOMYS, or LAGOSTOMUS. [CHINCHILLIDÆ, vol. vii., p. 87.]

Having an opportunity of giving a figure from the living animal in the menagerie of the Zoological Society at the Regent's Park, we here subjoin it. The skeleton (from the late Mr. Brookes's figure) is given in the article referred to.



Viscacha, or Biscacho.

LA'GOTHRIX, M. Geoffroy's name for a genus of South American monkeys, thus characterised:—

Dental formula: — Incisors $\frac{4}{4}$; Canines $\frac{1-1}{1-1}$; Molars $\frac{6-6}{6-6} = 36$.

Facial angle about 50°; muzzle projecting; head round; extremities proportioned to the body; anterior hands provided with a thumb; tail strongly prehensile, and having a part of its extremity naked below; hair strong and curly. Two species are recorded, *Lagothrix Humboldtii* and *Lagothrix canus*.

The first of these, or the *Caparro*, was found by Humboldt and Bonpland in the hut of an Indian, who had captured it in an excursion to the westward. Size about two feet two inches without the tail. Head round and very large. Hair long, strong, and uniform grey, the tips black. Face naked and black; mouth beset with long stiff bristles. Tail rather longer than the body, prehensile, naked at the extremity.

Habits gregarious; frequently seen raised on the hinder extremities.

Locality, Rio Guaviare, one of the tributary rivers of the Orinoco.

The other species has shorter hair, and is of the size of the *Sapajou-sai* (*Cebus Capucinus*, Desm., *Simia Capucina*, Linn.).

Locality, Brazil.

Mr. Gray places the form in his family *Sariguidæ*, and in the second subfamily of it, viz. *Atelina*.

Mr. Swainson arranges it in the family *Cebidæ*, between *Mycetes* and *Ateles*.

LAGOTIS. [CHINCHILLIDÆ, vol. vii., p. 83.]

LAGRANGE, JOSEPH LOUIS DE, was born at Turin, 25th January, 1736. His parents were Joseph Luis Lagrange and Marie Thérèse Grass, the daughter of a physician at Cambiano. His father held the office of treasurer of war at Turin, and had once been in affluent circumstances, but had ruined himself by injudiciously entering into hazardous speculations. To this circumstance, which was then regarded as a misfortune, Lagrange himself has frequently attributed a considerable share of his subsequent fame and happiness. 'Had I been rich,' he has been heard to say, 'I should probably not have become a mathematician.'

In the early part of his studies he manifested no particular love either for the pure mathematics or the physical sciences. His chief delight consisted in the perusal of the various Latin authors, and more especially the works of Cicero and Virgil. These however in his second year were superseded by the synthetical writings of the antient geometricians, and these in their turn gave place to the more powerful analysis of modern times. The perusal of a memoir by Dr. Halley (*Phil. Trans.*, 1693) 'On the superiority of modern algebra in determining the foci of object-glasses' is said by his biographers to have convinced him of the utter inadequacy of geometrical methods as instruments

of investigation, and it is not improbable that this might have been the occasion of his selecting the path which he thenceforth pursued with so much honour to himself and so great advantage to science.

Before he attained the age of nineteen he was appointed to the professorship of mathematics at the military college of Turin, where by far the greater part of his pupils were older than himself. The year following (1755) he addressed a letter to Euler, relative to the isoperimetrical problems, and that of the curve of quickest descent, which had engrossed so much of the attention of the principal mathematicians of the day, and of Euler in particular; but, owing to the want of general methods, their labours had proved but partially successful. Each problem had been resolved by methods peculiar to itself, and the solutions rested upon artifices unsatisfactorily indirect. In this letter Lagrange communicates the germs of his calculus of variations, to which his recent analytical researches had led, and shows with what advantage and facility it may be applied to the problems in question. Euler, in his reply, expresses his entire concurrence in the correctness of its principles, and hails the discovery as the harbinger of others of yet greater importance; he acknowledges how much the application of these principles had promoted the success of his own recent investigations, which however he refrained from publishing until the remainder of the researches of Lagrange were made known, lest he should thereby deprive him of any portion of the glory which was so justly his due, and concludes by announcing the nomination of Lagrange as a member of the Academy of Berlin.

In 1758 he took an active part in the foundation of the Royal Academy of Turin [ACADEMY, vol. i., p. 62], in which he was unanimously chosen the director of the physico-mathematical sciences. The following year appeared the first volume of the Transactions of that Society, consisting principally of the researches of Lagrange on the propagation of sound, and on the integration of differential equations, and those of finite differences. He here also proves, on the subject of vibrating chords, that the time of oscillation is independent of the figure of the chord, an empirical truth, the demonstration of which D'Alembert believed to be impossible (see the preface to D'Alembert's *Opuscules Mathématiques*, Paris, 4to., 1761, tome i.) [D'ALEMBERT.] Lagrange and D'Alembert were rivals, but not opponents. Their cause was a common one, which each laboured to promote with indefatigable zeal. The manner in which their controversies were conducted shows that they were prepared to sacrifice every personal feeling to their love of truth and the advantage of science. When either attempts the refutation of his rival's theory, it is frequently by means of the beautiful theorems to which the researches of the other has already led. On the other hand, a discovery of importance, by whichever party it may happen to be made, is immediately followed by the congratulations of him from whom congratulation is due. Thus D'Alembert, in one of his letters to Lagrange, says, 'Your problem appeared to me so beautiful, that I have investigated a solution upon different principles;' and upon another occasion, when the Academy had proposed the 'Theory of the Libration of the Moon' as the subject of one of its prizes, and the medal had been awarded (1764) to the memoir of Lagrange, we find D'Alembert writing to him solely to express the pleasure and advantage which he had derived from its perusal, and his acquiescence in the justice of the award.

The calculus of variations, upon the discovery of which the fame of Lagrange may be permitted to rest, is eminently important in many branches of the mathematics, as in the determination of the maxima and minima values of indefinite integral formulæ, &c.; but its utility is most conspicuous in the higher branches of physical astronomy. The space allotted to this article admits of our giving but one illustration of its importance in this respect. Euler, in his 'Treatise of Isoperimeters,' printed at Lausanne in 1744, had shown, that in the case of trajectories described about a central force, the product of the integral of the velocity and the element of the curve was either a maximum or minimum; but when he attempted to extend this principle to a system of bodies acting one upon another, he found that the highest analysis of which he could avail himself was insufficient to overcome the difficulties of the problem. This failure on the part of Euler excited the emulation of Lagrange, whose chief objects appear generally to have been the extension and generalization of existing theories. By a beautiful application of his method of variations to a principle of dynamics discovered by Huyghens, and known by the name of the *Conservation of vis viva*, he was led to the following general theorem: 'In every system of bodies acted upon by forces proportional to any function of the distance, the curves described by the bodies are necessarily such that the sum of the products of the mass, the integral of the velocity and the element of the curve, is always either a maximum or minimum.' This theorem, the proof of which offered so much difficulty to Euler, has been denominated the *principle of least action*, and is frequently regarded as one of the four great principles of dynamics, although Lagrange has shown that it is merely a corollary to a still more general formula given by him in the second section of the second part of his 'Mécanique Analytique.'

When the Academy of Berlin was threatened with the departure of Euler for St. Petersburg, Frederick renewed his importunities to D'Alembert to succeed him. [D'ALEMBERT.] D'Alembert however, from various motives, being unwilling to quit his native country, suggested that the proffered honour might be conferred upon Lagrange. Lagrange was accordingly appointed professor of the physical and mathematical sciences to the Academy, and continued for more than twenty years to enrich the memoirs of that Society with his researches connected with physical astronomy and other subjects of importance. The insignificant stipend (1500 crowns) which was allotted to him, when contrasted with the munificent offers made to D'Alembert, cannot fail to strike every reader with surprise. Lagrange quitted Berlin after the death of Frederic, not being satisfied with the treatment he then received. He had previously been invited by the ministers of Louis XVI. to settle in Paris.

In 1772 M. Lagrange was elected foreign associate of the Royal Academy of Paris, and in 1787, on his arrival at the French capital, he received the honorary title of veteran pensioner. Apartments were allotted to him in the Louvre, and here, surrounded by the principal mathematicians of the day, he continued to live happily up to the time of the Revolution. After this he began to be subject to fits of melancholy, which so far increased upon him that he has been heard to say that his enthusiasm for the sciences was extinguished, and that his love of physical research had disappeared. He was successively appointed professor of mathematics to the normal and polytechnic schools, member of the Institut, of the board of longitude, grand officer of the legion of honour, and count of the empire. He died at Paris, the 10th April, 1813, in his 78th year. His remains were deposited in the Pantheon, and his funeral oration was spoken by his illustrious friends Laplace and Lacépède.

'Among those who have most effectually extended the limits of our knowledge,' said Laplace, in his funeral oration, 'Newton and Lagrange appear to have possessed in the highest degree the happy art of detecting general principles, which constitutes the true genius of science. This art, joined to a rare elegance in the exposition of the most abstract theories, characterized Lagrange.' His work on Mechanics, resting upon the method of variations of which he was the inventor, flows wholly from a single formula, and from a principle known before his time, but of which no one but himself was able to appreciate the importance. 'Among the successors of Galileo and Newton,' says Professor Hamilton, speaking of the theoretical development of the laws of motion, 'Lagrange has perhaps done more than any other analyst to give extent and harmony to such deductive researches, by showing that the most varied consequences respecting the motions of systems of bodies may be derived from one radical formula; the beauty of the method so suiting the dignity of the results as to make of his great work a kind of scientific poem.'

We conclude this imperfect sketch of the life and writings of Lagrange with a list of his published works, which we believe to be complete:—

Letter dated 23rd June, 1754, addressed to Jules Charles Fagnano, containing a series for the differentials and integrals of any order whatever, and corresponding to the Binomial Theorem of Newton, Turin, 1754; 'Analytical Mechanics,' 1st edit. 1788, 2nd edit. 1811—1815 (the second volume of the last edition is edited by MM. De Prony, Garnier, and Binet). 'Theory of Analytical Functions,' 1st edit. 1797, 2nd edit. 1813; 'Resolution of Numerical Equations,' 1st edit. 1798, 2nd edit. 1808, 3rd edit. (edited by Poinsot) 1826; 'Lessons on the Calculus of Functions,' 1st

edit. 1801, 2nd edit. 1804, 3rd edit. 1806 (printed in the 'Journal of the Polytechnic School,' tome 5).

Memoirs in the Transactions of the Academy of Turin.

1759. Tome 1. Method of Maxima and Minima; Integration of Differential Equations and Equations of Finite Differences; On the Propagation of Sound.

1762. Tome 2. Supplement to the Researches on the Propagation of Sound, contained in vol. 1; A new method of determining the Maxima and Minima of Indefinite Integral Formulæ; application of that method to Dynamics; New Researches on the Propagation of Sound.

1765. Tome 3. Application of the Integral Calculus to Dynamics, Hydrodynamics, and Physical Astronomy.

Tome 4. Integration of Differential Equations; Method of Variations; On the Motion of a Body acted upon by two Central Forces.

Tome 5. On the Percussion of Fluids; New Theory of the Integral Calculus.

Memoirs in the Transactions of the Academy of Berlin.

1765. Tome 21. On Tautochronous Curves.
1766. Tome 22. On the Transit of Venus, June 3, 1769.
1767. Tome 23. On the Solution of Indeterminate Problems of the second degree, and on Numerical Equations.
1768. Tome 24. Additions to the Memoir on the Resolution of Numerical Equations; New Method of resolving Indeterminate Equations; New Method of Resolving Algebraic Equations by means of Series.
1769. Tome 25. On the Force of Springs, on the Problem of Kepler, and on Elimination.

Memoirs in the Transactions of the Berlin Academy (new series).

1770. On Tautochronous Curves; Algebraic Equations, and Arithmetic.
1771. On Prime Numbers and Algebraic Equations.
1772. On Differentiation and Integration; on Imaginary Roots; Astronomical Refraction; Integration of Equations of Partial Differences.
1773. On the Rotatory Motion of a Body; on the Attraction of Elliptic Spheroids; on Triangular Pyramids and Arithmetic.
1774. On the Particular Integrals of Differential Equations; on the Motion of the Nodes of the Planets' Orbits.
1775. On Finite Differences; the Attraction of Elliptic Spheroids; and Arithmetic.
1776. On the Change in the Mean Motions of the Planets; Continued Fractions; and Spherical Astronomy.
1777. Diophantine Analysis; On Escapements; Determination of the Imaginary Roots of Algebraic Equations; on the Motion of a system of Bodies which mutually attract each other inversely as the square of the distance.
1778. Determination of the Orbits of Comets from three observations; Theory of Telescopes.
1779. On Particular Integrals; Construction of Geographical Maps.
1780. Libration of the Moon, and on other problems depending upon the Non-Sphericity of that Planet.
1781. Theory of the Motion of Fluids; Principles and general formulæ for determining the secular variations of the Planets' Orbits; Report of M. Lagrange on a method proposed for finding the Quadrature of the Circle.
1782. Continuation of the preceding Memoir on Secular Variations; Report of Lagrange on a method proposed for determining whether the Earth is flattened at the poles.
1783. On the periodical variations in the Planetary Motions; Secular Variations in the Mean Motions of the Planets; Corrections of the common methods of Approximation for integrating the Equations of the Planets' Motions; a particular method of Approximation and Interpolation; a new property of the Centre of Gravity; Third Memoir on the determination of the Orbits of Comets.
1784. Theory of the periodical variations in the Planets' Motions, independent of the Inclinations and Excentricities, for each of the six principal planets.
1785. Partial Differential Equations.
1786. Geometrical Theory of the Motion of the Aphelia, to serve as an addition to Newton's Principia; Correction of those parts of Newton's Principia relative to the Propagation of Sound and the Motion of Waves.
1792-3. Solution of a problem in Life Annuities; Determination of the general term of a recurring series whose generating equation contains equal roots; on Elliptic Spheroids; on Interpolation; on the Secular Equation of the Moon; Addition to a Memoir by M. Duval-le-Roi on the Secular and Periodical Variations of Herschel, printed in the Memoirs of the year 1787.
1803. On a General Law of Optics.

Memoirs in the Transactions of the Academy of Paris.

1764. On the Libration of the Moon (this is the memoir for which the medal was awarded to M. Lagrange by the Academy, and in which he first employs the principle of Virtual Velocities).
1766. On the Inequalities of Jupiter's Satellites.
1772. On the formation of Tables of the Planets; on the Problem of Three Bodies.
1774. On the Motion of the Nodes and the Inclinations of the Orbits of Planets.

Savans Etrangers.

Tome 7. On the Secular Equation of the Moon. (Prize Memoir for the year 1774.)

Tome 10. On the Perturbations of a Comet which passes near to a Planet.

French Institute. Memoirs of the First Class.

1808-9. On the Variation of the Elements of a Planet, and more particularly the Variation of the Major Axis of their Orbits; Theory of the Variation of Arbitrary Constants in all Mechanical Problems (2 Memoirs).

Journal of the Polytechnic School

Tome 2. On the principle of Virtual Velocities; Essay on the Transformation of Fractions; Theory of Analytical Functions; Analysis of Spherical Triangles.
Tome 5. On the Calculus of Analytical Functions.
Tome 7. Supplement to the same.
Tome 8. On the Attraction of Spheroids

Connaissances des Tems.

1814. On the Origin of Comets.
1817. On the Calculation of Eclipses.
1819. Remarks on the Method of Projection in the Calculation of Eclipses.
1821. Method of determining the Orbit of a Comet from Observation.

M. Carnot, while minister of the Interior, recommended to his government the purchasing of the manuscripts of Lagrange, and, at his suggestion, the mathematical and physical class of the Institute nominated a commission to select such as were in a state for publication; the rest are arranged and deposited in the library of the Institute.

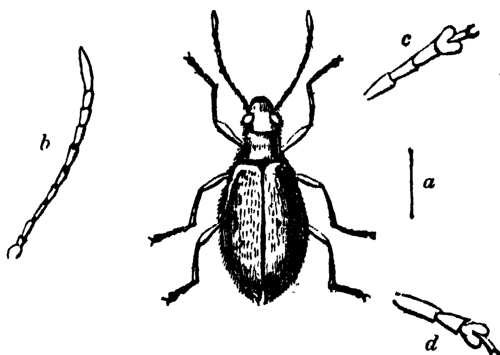
(*Eloge de M. Delambre; Mémoires de l'Institut*, 1812; Lagrange, *Mécanique Analytique*, 1815; Lagrange, *Théorie des Fonctions Analytique*, 1813; *Miscellanea Taurinensia*, 1759-61; *Opuscules Mathématiques de M. d'Alembert*, 1761-9; *Notice of the Life of Lagrange*, by Maurice; *Biog. Universelle;* Professor Hamilton's *Memoir on a General Method in Dynamics*, in *Phil. Trans.*, 1834; *Dictionnaire Bibliographique de* Quérard, 1829, &c.)

LAGRIIDÆ (*Lagriariæ*, Latreille), a family of Coleopterous insects of the section Heteromera, the characters of which are—Elytra soft; head and thorax considerably narrower than the elytra, the latter almost cylindrical, ovate or quadrate and truncated; antennæ inserted near an emargination of the eyes, either filiform or insensibly larger towards the apex, the terminal joint being longer than the preceding, especially in the males: palpi thickened at the tip; terminal joint of the maxillary palpi of the form of a reversed triangle; femora oval and clavate; tibiæ long and slender; those of the anterior legs often curved; penultimate joint of the tarsi bilobed and the claws simple. The genus *Lagria*, Fab., contains those species in which the antennæ are gradually thickened towards the apex, and have the last joint ovate: the fore part of the head is but little produced, but behind is prolonged and slightly rounded; the thorax is almost cylindrical or square.

One species of this genus exists in England; the *Lagria hirta*, an insect not unfrequently found in hedges and woods, and apparently most abundant on the white-thorn. It is about 4-12ths of an inch in length, of an oval form, with a narrow head and thorax; these, as well as the body beneath, the antennæ, and the legs, are black; the elytra are dirty yellow, soft, and pubescent. The body of the males is rather narrower than that of the females, and the antennæ are longer.

The genus *Statyra* (Latreille) also belongs to the present

family, and consists of species which have the body more elongated than those of Lagria proper; the antennæ are filiform, and consist of almost cylindrical joints, the last of which is very long and pointed: the head is considerably produced in front of the eyes, and is abruptly narrowed behind; the thorax is longer than broad, somewhat ovate, but truncated before and behind; the elytra are acutely terminated.



Lagria hirta.

The line *a* denotes the natural size; *b*, the antenna; *c*, the tarsus of the fore and middle pair of legs; *d*, the tarsus of the posterior pair of legs.

LA HARPE. [HARPE, LA.]

LAHIRE, PHILIPPE DE, was born at Paris, March 18, 1640, in which city he also died, 21st of April, 1719. Up to the age of twenty-four years he followed the profession of his father, who had acquired considerable reputation as professor of painting and sculpture to the Royal Academy. In 1660 he visited Italy, partly for the improvement of his health, and partly with a view to the completion of his professional education. While at Venice he applied himself to the study of geometry, and more particularly to the conic sections of Apollonius; and a few years after his return to Paris, he published several treatises upon those subjects, which fully established his claim to the reputation of a profound geometrician. In 1679, Colbert having suggested the construction of a general map of France, Picard and De Lahire were nominated by the king to conduct certain surveys along the coast of Gascony, and in 1683 De Lahire, in conjunction with Dominic Cassini, was instructed to proceed with the measurement of the meridian, which had been commenced in 1669 by Picard. [PICARD.] The death of M. Colbert having put a stop to this important undertaking, he was next employed in determining the difference of level of the river Eure and the reservoir of Versailles, preparatory to the construction of an aqueduct for the supply of the capital, which he effected to the satisfaction of the king and of Louvois, the then minister. The other public works in which M. de Lahire was successively engaged were numerous and important, but our limits will not permit us to notice them more particularly. He was twice married, and 'each of his marriages,' says M. Fontenelle, 'furnished an Academician.'

Although he does not appear to have been altogether unacquainted with the infinitesimal calculus, the whole of the subjects upon which he has written are treated synthetically. In his manners he was more reserved than the generality of his countrymen, but the uprightness and disinterestedness of his conduct were most exemplary. A pure piety, free from superstition and singularity, characterized the whole of his life.

For further information the reader may advantageously consult the 'Mémoires de Nicéron,' tom. v. and x.; 'l'Histoire du Collége Royal,' by Goguet; and the 'Eloge de Lahire,' by Fontenelle ('Œuvres Diverses,' fol. 1729), from which this notice is chiefly drawn. His published works are—'Treatise on Conical and Cylindrical Sections,' Paris, 1673, 4to.; 'De Cycloïde Opusculum,' 1676; 'Conic Sections and Geometrical Loci,' 1679; 'Gnomonics, or the Art of making Sun-dials,' 1682; 'Conic Sections,' 1685, fol.; 'Tabulæ Astonomicæ,' 1702, 4to.; 'Treatise on Surveying,' 1689; 'Mechanics,' 1675; 'Description of the Globes in the Pavilion of the Château de Marli,' 1704; besides numerous memoirs in the public journals of the day, and more particularly in the 'Transactions of the Academy of Sciences,' from 1666 to 1718.

LAHN, river. [RHINE.]

LAHORE, a province in the northern part of Hindustan, lying between 30° and 34° N. lat., and between 71° and 78° E. long. It is bounded on the north by Cashmere, on the east by the mountains of Northern Hindustan, on the south by Delhi, Moultan, and Ajmeer, and on the west by the Indus; it contains nearly 70,000 square miles of surface, its mean length and breadth being respectively about 340 and 200 miles. This territory is under the dominion of Runjeet Singh, the most powerful of all the native princes of India, and who is completely independent of the English government. His kingdom is divided geographically into two nearly equal parts, viz. 1. The Punjaub, a level country which derives its name from its lying among the five branches of the Indus, and, 2. the Kohistan, or Hill Country. The most productive part of the country is the Punjaub, especially in the neighbourhood of the rivers. The portion of this country that lies to the east is under the best cultivation; to the west much of the land is devoted to pasturing large herds of oxen and buffaloes, besides some droves of horses, which are of a pretty good description. The products of cultivation in the Punjaub are chiefly wheat, barley, rice, pulse of various kinds, sugar, and tobacco, but there is seldom much of these articles left for exportation after satisfying the wants of the inhabitants. Such exports as are made go for the most part to countries west of the Indus and to Cashmere. The temperature of the Kohistan country is hot in summer, but in winter it is at least as cool as the middle and southern parts of Europe. The pine and the willow are common. The sides of the hills, where the soil is strong, yield good crops of wheat, barley, and some smaller kinds of grain. Rice is grown in the valleys, but not to any great extent, as that grain does not enter much into consumption in Lahore. In the level country there are many large and populous villages; some towns, which have been of larger dimensions, are, with a few exceptions, fast falling into ruin. The number of souls under the dominion of the Rajah of Lahore is said to be 3,500,000. In some of the districts near the Indus manufactures of silk goods are extensively carried on. The manufactured plain and striped silks are considered to surpass in beauty those of every other country, and large quantities of them are every year exported to Caubul and Candahar. Of three caravans which leave the province annually for those countries, the first is said, by Captain Burnes, to be composed of 29,000 camels. White cotton goods, and occasionally indigo, sugar, and rice, are exported to the countries west of the Indus, and to Cashmere, in return for which, shawls, various kinds of cloths, and fruits are imported. Horses and camels, with some rice, sugar, and cotton-cloths, are exported to the south, and in return the merchants bring back metals, spices, and various European manufactured goods. The traffic would doubtless be much greater than it is but for the many duties exacted by the petty rulers of districts through which the goods are carried.

Until the early years of the present century, when the growing power of the present Rajah began to be extensively acknowledged among them, the province of Lahore was distracted by the incessant feuds of numerous petty chiefs, among whom the country was divided, and which armed against each other the inhabitants of neighbouring towns and villages. These feuds have happily ceased, and the whole of the chiefs now make common cause under one leader, who maintains an army of 80,000 men, of whom 50,000 are cavalry disciplined according to the European system. Runjeet Singh can also bring into the field 200 pieces of artillery, and the whole of his force is maintained upon such a footing of efficiency, that the friendship of this prince, whose territory forms a barrier against approaches from the north and west, cannot but have a powerful influence in securing the quiet of the Anglo-Indian Empire. On the 25th of April, 1809, in consequence of the hostile designs of France and Russia, a treaty was concluded with this prince containing little in addition to general declarations of amity on both sides, and upon this footing he has since continued with the English. In the course of the year 1831, a meeting took place between Runjeet Singh and the Governor-general, Lord William Bentinck, on which occasion considerable pomp and splendour were displayed on both sides.

LAHORE, the capital of the province of that name, under the dominion of the Rajah Runjeet Singh, is situated in 31° 36′ N. lat. and 74° 3′ E. long., on the south bank of Ravee river. Lahore is a place of high antiquity, and was the residence of the first Mohammedan conquerors of Hin-

dustan, before they succeeded in establishing themselves in the central parts of the peninsula. Humaioon, the father of Akbar, made it his place of residence during a great part of his reign, and by him it was greatly enlarged and improved. The city and suburbs are said to have then extended three leagues in length. Thevenot, who was there in 1665, says, that the city, exclusive of the suburbs, was then a league in extent. Many of the buildings have since gone to ruin, but the city is even now of considerable size. The inhabitants not being in general wealthy, their dwellings are usually mean in their appearance; there are however some remarkable buildings. The mausoleum of Jehangire is magnificent, and in very good preservation. The tomb is a square building 66 paces on each side, and the whole is surrounded by a wall, each side of which is 1800 feet. On the south side of the city in the open plain is another tomb, that of Noor Jehan Begum, which is very handsome and 36 paces square. These, and the numerous domes and minarets of the mosques, give the city an imposing appearance at distance, but which is not confirmed by nearer inspection. Lahore is not a place of much strength. About thirty years ago it was surrounded by a wall and a broad ditch, having ramparts and bastions at intervals. The city is distant 380 miles from Delhi, 517 from Agra, 619 from Lucknow, 1070 from Bombay, and 1356 from Calcutta, all travelling distances.

LAIBACH, or LAYBACH. [ILLYRIA.]

L'AIGLE. [ORNE.]

LAINEZ. [JESUITS.]

LAIRESSE, GERARD, an eminent painter, was born at Liége in 1640. He acquired his knowledge of the art from his father; but there is reason to believe that he also studied under Bartolet, from whom he probably derived the taste for the antique which appears in his works. He first followed his profession at Utrecht, where he met with little encouragement, but having been advised to send one of his pictures to the famous picture-dealer Vylenburg, at Amsterdam, he was so pleased with it that he prevailed on Lairesse to remove to Amsterdam, which proved the means of raising him from poverty and obscurity to fortune and reputation.

Having a lively imagination, great rapidity of execution, and great industry, the number of paintings which he executed was very great. They are, it is true, of very unequal degrees of merit, but all bear the marks of genius: his expression is generally good, his colouring true and glowing, and his touch light and firm; his draperies too are well cast, broad, simple, and in natural folds. When he introduces architecture into his backgrounds, it seems to have been designed after Greek or Roman models. He had the misfortune to become blind several years before his death; but in this state he was surrounded by artists and lovers of painting, to whom he was fond of communicating instruction. The celebrated treatise on the art of painting which goes by his name, was not actually written by him, but compiled from his observations during his blindness, and published by a society of artists after his death, which happened in the year 1711, in the 71st year of his age.

'It would be unjust,' says Fuseli, 'not to mention Lairesse as an etcher, an art in which he had few rivals, whether we consider the decision, clearness, strength, or facility of his tool.'

LAITY, persons not clergy; that is, the whole population except those who are in holy orders. All the lexicographers, we believe, agree in deriving it from the Greek word *laos* (λαός), the people. A *Layman* is one of the Laity. The terms are not used except when the mind is directed to the distinction of the two classes.

LAKE, GERARD, first Viscount Lake, the second son of an antient family, was born July 27, 1744. Having entered the army at the early age of 14, and made his first campaigns in the Seven Years' War, he served afterwards in the American War, in Holland with the Duke of York in 1793, and having attained with credit to the rank of general, was appointed to the chief command in Ireland during the Rebellion of 1797-8.

In 1800 he was sent as commander-in-chief to India, during the Marquis Wellesley's government. On the breaking out of war with Scindiah, in 1803 [MAHRATTAS], General Wellesley being charged with the conduct of affairs in the Deccan, Lake himself took the field in the north of Hindustan. August 28, he crossed the north-western frontier of Oude, into the Mogul territory, and after taking by storm the strong fort of Alighur, arrived within six miles of Delhi, September 11. The Mahrattas, in superior force, offered battle in defence of the city, and Lake led his troops at once to the attack. The enemy's position was strong; and a repulse seemed likely to ensue, when Lake, by a well conducted feint of retreat, lured the Mahrattas from their entrenchments, and then resuming the offensive, won the day by one brilliant and decisive charge. He entered Delhi the next day: and the Mogul emperor, Shah Allum, the nominal sovereign of India, old and blind, who had been but a puppet in the hands of the Mahrattas, gladly passed into the more decent and secure guardianship of the British government. Lake next marched upon Agra, which was taken after a stout resistance. A fresh descent of the Mahrattas recalled him towards Delhi: and on the 1st November he won another well-fought but decisive battle near the village of Laswaree. By this series of successes the whole of Scindiah's possessions north of the Chumbul River fell into his hands: and in reward General Lake was raised to the peerage, September 1, 1804, by the title of Baron Lake of Delhi and Laswaree, and Aston-Clinton, in Bucks.

In 1804-5, Lord Lake again took the field in the same part of India, against Holkar. In these campaigns he was less uniformly and brilliantly successful: still he had reduced Holkar's power to a low state when the arrival of the Marquis Cornwallis as governor-general substituted a peaceful policy for that system of conquest which Lord Wellesley had so energetically pursued. Lord Lake returned to England in September, 1807, and was immediately created a viscount, October 31. He died Feb. 20, 1808. (Collins's *Peerage*; *Hist. Brit. India*.)

LAKES are in the land what islands are in the sea; they are surrounded on all sides by land, as islands are by water. They are sheets of water of greater or less extent, and differ from lagoons in their origin, and from tanks and reservoirs by their being naturally formed, whereas the latter are the works of man. From ponds and pools it is not so easy to distinguish them, it being difficult to draw the line between a large pond and a small lake. The feature by which perhaps they would be best distinguished is this, that a lake is fed by streams either flowing at the surface of the soil or subterraneous, while a pond, though large, is only the accumulation of rain-water in some hollow. Thus ponds are usually dried up in hot weather, while true lakes are only temporarily diminished by heat.

Lakes have sometimes been divided into fresh-water lakes and salt-water lakes; though here again it is not easy to draw the line between the two, as from the freshest to the most salt the degrees of saltness are very various.

The principal difference in lakes is this: some have no apparent affluents nor outlet, others have affluents without any visible outlet, some have an outlet without any visible affluents, and others again have both affluents and an outlet.

Lakes without apparent affluents or outlets are comparatively small, and yet they are, relatively speaking, more permanent than larger lakes, because, being fed chiefly by subterraneous springs, they are not liable to be filled by those deposits of earth and sand which are the main cause of the rapid dessication of such lakes as receive the troubled waters of torrents and rivers. If we follow the usual custom and call all natural sheets of water lakes, then there are many lakes without affluents or outlet. Thus they are very numerous to the northward of the Caspian and in the plains which extend between the Ural Mountains and the Irtish, as also in the great Steppe of Baraba between the Irtish and the Ob. But in truth the greater part of these are more properly ponds, formed of the accumulated waters from rain and melted snow. The largest of them are not more than ten or twelve miles in circumference and six or seven feet deep; indeed many of them are quite dried up towards the end of summer. Some are salt and yield considerable profit. Their saltness is not easily accounted for; the more particularly as among and close to those that are salt there are many whose waters are quite fresh. The opinions of naturalists on the subject of salt lakes are very various, and no satisfactory theory has perhaps yet been offered. Small lakes of the kind of which we have been speaking, that is to say, such as have neither affluents nor outlet, sometimes occur in hollows resembling the craters of extinct volcanoes. We say resembling, because although Dolomieu, Spallanzani, and others, maintain the existence of lakes in such craters, M. Desmarest, upon apparently

very good reasons, absolutely denies the possibility of lakes existing in the craters of extinct valcanoes. The celebrated Lake of Averno is, according to Ferber and Breislak, situated in an antient crater.

Of lakes which receive affluents without having any visible outlet, the largest is the Caspian. The Aral, and the Dead Sea, or Lake Asphaltites, are also examples of this kind of lake, which is very common in Asia. Some of them are of vast extent, such for instance is the lake Terkiri in Tibet, 27 leagues long and 9 leagues wide, and the lake Hoho-nor, or Koko-nor, in the same country, whose surface is 240 square leagues. It was at one time thought that the saltness of certain lakes was due to the circumstance of their receiving the saline impurities of their affluents, which impurities could not escape for want of an outlet; but on the one hand, the Durrah in Segistan, which receives the Helmund and has no outlet, is perfectly fresh; and on the other, there are many salt lakes which have no affluents hence the saltness of lakes must have some other cause. The question has sometimes been asked, what becomes of the excess of water brought into lakes having no outlet? Halley thought evaporation was all-sufficient to carry it off, and his opinion is highly plausible. If however it shall be found by actual experiment that a greater quantity of water is brought into a lake without apparent issue than can be carried off by evaporation, the natural conclusion will be that the surplus is lost by infiltration or subaqueous drainage. Several of these lakes have formerly had outlets, but water has ceased to flow from them, because the lakes have sunk in consequence of receiving now a much smaller quantity of water than formerly. There are many lakes in Europe at the present day whose outlets are diminishing; such among others are the lakes Balaton and Neusiedel in Hungary. The extent of surface of the former is very great compared with the quantity of water which it receives, so that the evaporation is rapidly diminishing the lake, and the river Selno, which used to carry off its superabundant waters and pour them into the Danube, is now nothing more than a slip of bog; and as for the Lake Neusiedel, it appears formerly to have communicated with the Danube by the Raab, into which it emptied its waters, and with which it has now no other communication than by a swamp. The Aral also, it is generally believed, once communicated with the Caspian.

Those lakes which have an outlet without any apparent affluent are fed by subaqueous springs, which, bursting out in a hollow, must fill it up before the waters can flow off in a stream. These lakes are generally situated at considerable elevations above the level of the sea. Thus there is one on Monte Rotondo in Corsica, at an elevation of 9069 feet. From lakes of this kind some of the largest rivers take their rise; the Volga, for instance, springs from such a lake in the government of Tver in Russia.

Lakes which receive one or more tributary streams and have a visible outlet for their superabundant waters are the most common and the largest; such are the lakes of Switzerland and of the north of Italy, the lakes Ladoga, Onega, Peipus, and Ilmen in Russia; the Saïma in Finland, the Wener in Sweden, the Enara in Lapland, &c. In Asia there are the Nor-Zaïssan and the Baikal, &c. In North America, Lake Superior, Lake Huron, Lake Erie, and Lake Ontario are examples of this kind of lake; each of them receives several affluents; and the grand outlet of the whole is the river St. Lawrence.

Lakes owe their origin to different circumstances: some from the sinking of the soil by the falling in of subterraneous caverns—such is the supposed origin of the Baïkal; others are caused by earthquakes—such a lake was formed in the province of Quito in 1797; some by the fall of mountains, as the Oschenen-see in the canton of Berne; or by lava currents damming up the stream, as the lakes Aidat and Cassiere in Auvergne, in France. Many are supposed to be the remains of the universal ocean which once covered the earth, and their waters, originally salt, have become fresh from their receiving constant supplies of fresh water while the salt was continually let off by their outlets.

Almost all lakes are in progress of diminution, although this is not everywhere apparent. The detrital matter brought in by their affluents is imperceptibly filling up their beds; and if regular observations were made, many provinces which owe much of their prosperity to their lakes would find the time fast approaching when these pieces of water will become mere pestilential marshes.

Certain lakes exhibit remarkable phenomena: thus some have floating islands in them, as is the case with a small lake near St. Omer. The lake Gerdau, in Prussia, has a floating island, on which a hundred head of cattle may be seen pasturing. In the lake Kolk, in Osnabrück, there is a floating island, on which fine elms are growing. Some of these floating islands sink and rise again; thus in the lake Rålang in Smoland, a province of Sweden, there is a floating island which appeared and disappeared ten successive times between the years 1696 and 1766. Other floating islands are found in East Gothland and many other places. Some subterranean lakes are supposed to have become so by the formation and subsequent fixing of floating islands, which successively uniting have finished by forming a solid crust over the water.

Some lakes have a double bottom, which rising and sinking alternately changes the apparent depth of the lake there is a lake of this kind at Jemtia in Sweden.

Some lakes are said to have no bottom; but this is an impossibility: the fact is, that the sound does not reach the bottom, either for want of sufficient weight of lead or length of line, or else it is carried away by under-currents.

In Poland there exists a lake said to render brown the skin of those who bathe in it. Certain mineral waters impregnated with sulphuretted hydrogen are well known to change from white to brown the skins of those persons who have been under a course of metallic medicines, or who use metallic cosmetics, and some such circumstance may be the case with the lake in question.

Some lakes are intermittent: the most remarkable of this kind are those of Cirknitz in Illyria and Kauten in Prussia. They are supposed to be occasioned by a play of natural siphons, upon the same principle as intermittent fountains.

The Lake of Geneva is subject to a subaqueous wind, called the *Vaudaise*, which, rising to the surface, produces an agitation of the water which is sometimes dangerous to the navigation of the lake. Near Boleslaw in Bohemia there is a lake of unknown depth, from the bottom of which there rise, in winter, such violent puffs of wind, that they are said to send up into the air masses of ice of several hundred pounds weight. The sudden escape of gases formed in the bowels of the earth, and perhaps the air forcibly driven out from caverns by the water rushing into and filling them up, may be among the causes of this remarkable phenomenon.

The *Seiches* are a phenomenon which has hitherto been observed only in the Lake of Geneva and some other of the Swiss and Italian lakes, though it is probably common to many others. It consists in an occasional undulation of the water, something like a tide wave, which rises occasionally to the height of five feet. Its cause is not exactly known, though it is most probably due to a local and temporary change of atmospheric pressure. Water-spouts are a phenomenon sometimes seen on lakes as on the sea; they have been observed on the lakes of Zürich and Geneva.

Certain lakes seem to be placed in the immediate neighbourhood of centres or foci of electrical attraction; thus in the lake Huron there is a bay over which electrical clouds are perpetually hovering. It is affirmed that no person has ever traversed it without hearing thunder. The proximity of this lake to the American magnetic pole, that is, to the spot where the magnetic intensity is greatest, not where the dip is greatest, may perhaps have some influence in producing so remarkable a phenomenon.

Near Beja in Portugal there is a lake which is said to announce the approach of a storm by a tremendous rumbling. In Siberia also, near the little river Oreibat, which flows into the Abakan, there is, according to Pallas, a lake called the Roaring Lake, from the dreadful noise it makes, and which announces internal revolutions similar to that which occasioned the rupture of the dykes of the Lake Gousinoï in Douaria.

Some lakes have been observed to possess a petrifying or an incrusting property. The latter is merely a deposition of carbonate of lime. This, being dissolved by an excess of acid in the waters of certain springs, is precipitated whenever the waters of these sources coming into the lakes are exposed to the air and lose their excess of acid.

There is an interesting phenomenon presented by the Lake of Zürich, called the flowering of the lake. When this takes place the surface of the water is seen covered

with a yellow scum or froth, which upon examination is found to be a very minute vegetation.

There are various other phenomena presented by lakes, but the most singular of them all perhaps is the attractive force of the mud at the bottom of some lakes, which is such that boats can hardly make their way through the water. The Lake Rose and one or two more in Canada are of this kind. Mackenzie describes the fact in these words:—'At the portage or carrying-place of Martres, on Rose Lake, the water is only three or four feet deep, and the bottom is muddy. I have often plunged into it a pole twelve feet long, with as much ease as if I merely plunged it into the water. Nevertheless this mud has a sort of magical effect upon the boats, which is such that the paddles can with difficulty urge them on. This effect is not perceptible on the south side of the lake, where the water is deep, but is more and more sensible as you approach the opposite shore. I have been assured that loaded boats have often been in danger of sinking, and could only be extricated by being towed by lighter boats. As for myself, I have never been in danger of foundering, but I have several times had great difficulty in passing this spot with six stout rowers, whose utmost efforts could scarcely overcome the attraction of the mud. A similar phenomenon is observed on the lake Saginaga, whose bottom attracts the boats with such force that it is only with the greatest difficulty that a loaded boat can be made to advance; fortunately the spot is only about 400 yards over.' Captain Back has confirmed the above by his late observations.

Lakes differ very much in temperature, transparency, and in the colour of their waters. Lakes fed by the water of melted snows in summer are generally much colder than would be thought conformable with the season; but the difference is principally in the lower waters, which, being cold, remain at the bottom by reason of their greater density. Some lakes never freeze, which is owing to their great depth. This is the case with Loch Ness in Scotland, which is 810 feet deep in the deepest part. Lakes are not subject to tides; at least the amount of tide, so far as observation goes, seems not to be ascertained.

The remarkable transparency of certain lakes is truly astonishing; thus the waters of Lake Superior are so pellucid, that, according to Mr. Heriot, the fish and rocks may be seen at a depth incredible to persons who have never visited those regions. The density of the medium on which the vessel moves appears scarcely to exceed that of the atmosphere, and the traveller becomes impressed with awe at the novelty of his situation. Elliot, in his 'Letters from the North of Europe,' says, 'Nothing appears more singular to a foreigner than the transparency of the waters of the Norwegian lakes. At the depth of 100 or 120 feet, the surface of the ground beneath is perfectly visible; sometimes it may be seen wholly covered with shells, sometimes only sprinkled with them; now a submarine forest presents itself to view, and now a subaqueous mountain;' and Sir A. de Capell Brooke observed of the same lakes, 'When a boat passes over a subaqueous mountain of a certain height, the visual illusion is so perfect, that one who has gradually, in tranquil progress over the surface, ascended wondering the rugged steep, shrinks back with horror as he crosses the vortex, under an impression that he is falling headlong down the precipice.' In the lake Wetter, in Sweden, it is said a farthing may be seen at the depth of twenty fathoms.

With regard to the colour of lakes, it may be observed that it is sometimes very difficult to account for the tints of large masses of water. The colour of the bottom, the depth, the shadows and reflected colours of surrounding bodies, subaqueous vegetation, springs, and many other circumstances, affect the colour of lakes.

Lakes perform a very important function in the economy of the earth. Rain does not always fall, and were it not for lakes, both visible and subterranean, those great natural reservoirs, the greater number of rivers would be dried up in summer, and canals could not have a constant supply of water. The freshness and humidity which these sheets of water occasion by their evaporation are also eminently favourable to the vegetation in their environs. Many lakes are of sufficient extent to be navigated, and thus facilitate commerce and industry. The fisheries of some are very valuable, and others, by the salt obtained from them, are a mine of wealth. Finally, they most agreeably diversify the surface of the earth by the various appearances which they present of the beautiful and the sublime.

LAKES are pigments prepared by combining vegetable or animal colouring matter with earths or metallic oxides; thus logwood [Logwood; Madder; Turmeric] and other woods and roots yield peculiar lakes; the general process is that of dissolving the colouring matter in a solution of potash or soda; and this, when added to a solution of alum, decomposes it, and the alumina and colouring matter are precipitated in combination. Indeed the affinity of some kinds of colouring matter for alumina is sufficiently strong to cause the formation of a lake without the intervention of an alkali, and merely by mixing aqueous solutions of the colouring matter and earthy salt.

LALAND. [Laaland.]

LALANDE, JOSEPH JEROME LE FRANÇAIS DE, was born at Bourg in the department of Ain, July 11, 1732. His parents were Pierre le Français and Marie Monchinet, of whom he was the only son. By their inordinate indulgence and extreme solicitude in anticipating all his wishes, he soon contracted habits of impatience and an irritability of temper, which, in after-years, he frequently found himself unable to control. Surrounded by Jesuits, and nurtured by his mother in the strict observance of devotional ceremonies, we are told that at the age of ten years it was not unusual for him, being disguised as a priest, to deliver a sermon of his own composition, to a select society, who requested as a favour to be present at the declamations of so precocious an orator. As his reason however began to be developed, he gradually detached himself from those occupations, notwithstanding the applause which his auditors were ever ready to bestow, and he as eager to receive, for while yet a child he evinced an unusual love of adulation. Many anecdotes are to'd in proof of the early acuteness of his perception and the strong desire which he manifested to comprehend the relation which one event bore to another.

When about thirteen or fourteen years old, he was sent to a college at Lyon, where for a time he appears to have derived equal pleasure from the study of poetry and eloquence, and from attending the lectures of the several professors on natural and metaphysical philosophy. Upon the occurrence of the great eclipse of 1748, of which, with the assistance of his tutor Le Père Béraud, he made a telescopic observation, he took great interest in the explanation given to him of that phenomenon, and thenceforward showed a more decided partiality for the mathematical sciences. But it was the perusal of Fontenelle's 'Entretiens sur la Pluralité des Mondes,' which, more than any other circumstance, influenced his choice of a profession by familiarising him with the sublime speculations of astronomers, and nourishing that love of distinction which characterized the whole of his career. 'It is with pleasure,' says Lalande himself, in his preface to an edition of that amusing book, which he afterwards edited, 'that I acknowledge my obligation to it for that devouring activity which its perusal first excited at the age of sixteen, and which I have since retained; from that time there appeared to me nothing comparable to the Academy of Sciences, and I desired ardently to see it long before I imagined there was a possibility of my ever becoming one of its members.' In order that he might devote himself more exclusively to the pursuit of the mathematics, he requested permission of his parents to become a Jesuit; but they now entertained views of a more ambitious and worldly nature, and instead of yielding to his request, held out the prospect of obtaining for him a lucrative appointment in the law, if he would consent to adopt that profession.

Under the pretext of acceding to their wishes he removed to Paris, where he commenced the study of jurisprudence; but his first visit to the observatory decided his vocation, for he immediately determined upon attending the course of astronomy at the College of France. Delille, who had recently returned from Russia, was then professor of astronomy to that institution, but he was old, and his long absence had occasioned him to be almost forgotten by the public, so that his lectures were very thinly attended. This latter circumstance enabled him to proportion his lessons to the progress of Lalande, whose rapid advances gave him the greatest satisfaction. They soon became mutually attached to each other, and Lalande was in the habit of frequenting the house of his tutor, where his mathematical difficulties could be more readily removed, and where he could gain experience in astronomical observation. About the same time he likewise attended the lectures of Lemonnier, whose

reputation as an astronomer was perhaps greater than that of Delille, and as both were fully competent to appreciate the ability of Lalande, there arose between these professors a sort of emulation as to which should contribute most to his future eminence. But notwithstanding the ardour with which Lalande applied himself to his favourite science, the study of the law was not altogether neglected. At the age of eighteen he received from the judicial authorities of Paris the title of Advocate, soon after which he received instructions from his parents to return to Bourg, where they were anxious that he should practise his profession for some years. A fortuitous circumstance induced them to abandon the plans which they had formed for the promotion of his welfare and happiness.

Lacaille, who was at that time about to take his departure for the Cape of Good Hope, with a view to the more exact determination of the moon's parallax, had called upon the astronomers of Europe to forward the object of his voyage by making observations at their respective observatories, similar to those which he contemplated making himself at the Cape. The favourable position of Berlin, which has nearly the same longitude, while it differs in latitude by nearly the fourth part of the earth's entire circumference, suggested to Lemonnier the peculiar advantages which would accrue from observations made at the observatory of that city. But it so happened that there were no instruments of any value at that observatory, and no person of ability had been appointed to its superintendance. Lemonnier instantly offered the use of his own instruments, and at his recommendation the academy confided to Lalande the responsibility of making the necessary observations. When Maupertuis presented Lalande to Frederick, the latter, as might be expected, expressed his surprise at receiving so young an astronomer—for Lalande had not then completed his nineteenth year,—but after many flattering expressions he gave orders that every thing should be done which could tend to the attainment of the object in view. Here, during the latter part of the year 1751, and the early part of 1752, Lalande passed most of his nights in the observatory; his mornings, in studying the mathematics under Euler; and his evenings, in the society of Maupertuis, Voltaire, D'Argens, and La Matrie. After completing his observations, the substance of which he communicated in a memoir to the Academy of Berlin, he returned to Paris, where the Royal Academy expressed their unqualified approbation of his conduct, and immediately elected him a member of their society. From his election till within a few years of his death, he contributed regularly to the Transactions of the Academy, and from this time his popularity as an astronomer may be dated.

The expected return of Halley's comet had led Clairaut to investigate the amount of the perturbations to which it would be subject. Lalande, with the assistance of Madame Lepaute, supplied him with all the numerical computations of which he had need; and when the appearance of the comet had realized their predictions, he wrote its history, which appeared in 1759, appended to a translation of Halley's planetary tables. In 1760 he was appointed editor of the 'Connaissances des Temps,' in which he introduced many important alterations, and gave to it the form which it has since retained. In 1762 he succeeded Delille as professor of astronomy to the College of France, and continued to discharge the duties of his office with zeal and assiduity for more than forty years. From among his pupils he was in the habit of selecting those who manifested peculiar attachment to astronomical science, and these he would invite to his house, where he perfected them in the calculations necessary for applying their theoretical knowledge to objects of utility. His residence was in fact a school wherein many of his pupils not only received a scientific education, but likewise board, lodging, and other necessaries, and from whence they afterwards removed either to conduct some observatory, to fill an astronomical lectureship, or as professors of navigation and nautical astronomy on board the vessels of the government.

In 1764 he published his large treatise on astronomy, which he afterwards extended to four volumes 4to. Before the appearance of this work there existed several able treatises on the theory of astronomy by La Caille, Cassini, and Lemonnier; but these contained little or no information as to the practice of astronomy. To supply this omission was the main object of Lalande. The work contains many biographical and historical notes, which will always be interesting, and the results of numerous observations to which it will always be useful to recur.

In 1772 he published his 'Account of the Transit of Venus,' observed 3rd June, 1769, which was drawn up with considerable labour from the communications of those persons who, at his recommendation, had been sent by several of the European governments to different parts of the globe, in order to observe the phenomenon.

Lalande died at Paris, 4th April, 1807, in his 75th year. As an observer, an author, and a tutor, he undoubtedly did much for the promotion of astronomy; but looking to the state of the mathematics at the time in which he lived, his knowledge of them appears to have been very limited. The candour and the warmth of his disposition gave full relief both to his virtues and his defects. He regarded concealment of any kind and under any circumstances as disreputable to an honourable man; and acting up to this opinion, he invariably expressed his sentiments without the slightest reserve, even when by so doing he prejudiced his own interests and those of his dearest friends. His love of truth, and the boldness with which he attempted to subvert all systems and opinions which did not accord with his own, and which sometimes partook rather of a spirit of fanaticism than of pure philosophy, excited against him a crowd of detractors and enemies. The extreme irritability of his temper led him on several occasions to acts of ingratitude towards Lemonnier, his early tutor and friend, who, to use Lalande's own expression, 'refused to see him during an entire revolution of the moon's nodes.' His attachment to his native town was such that he made a point of visiting it every alternate year during the college vacation; and upon these occasions he gave public lectures, founded an Academical Society, and neglected nothing which might inspire a love of science and of letters. His filial affection induced him frequently to attend the devotions of his mother, although the creed which she had so zealously endeavoured to inculcate had been greatly modified, if not altogether eradicated, by his intercourse with Voltaire and others while at Berlin.

To conclude, although his moral character is not altogether irreproachable, he was always ready to patronize the needy votary of science, and he would advocate the cause of a friend at the risk of his own personal safety.

The following is a list of his principal publications:—

'Navigation, its History, Theory, and Practice,' Paris, 1793, 4to.; 'The Physician's Almanack,' Paris, 1800; 'The Geographical and Chronological Almanack,' 1799-80; 'Astronomy,' 1st edition, 1764, 2 vols. 4to.; 2nd ed., 1771-81, 4 vols. 4to.; 3rd ed., 1792, 3 vols. 4to.; the same work abridged, Amsterdam, 1774; Paris, 1775-1795, 8vo.; 'Astronomy for Ladies,' last edition, 1824; 'Astronomical Biography,' 1803, 4to.; 'Treatise on Canals in general, and in particular of the Canal of Languedoc,' Paris, 1778, fol.; 'Transit of Venus,' 1764, 4to.; 'Description of a Machine for dividing Mathematical Instruments, translated from the English of Ramsden,' 1790; 'A Discourse tending to prove "That the spirit of justice constitutes the glory and security of empires,"' to which the Academy of Marseille awarded their prize, 1757; 'Dissertation on Capillary Attraction,' 1770; 'Ephemeris of the Heavens,' 1775-1800; 'Exposition of Astronomical Calculations,' 1762; 'French Celestial History,' 1801; 'Letter to Cassini on the subject of Saturn's Ring,' 1773; 'Memoir on the Interior of Africa,' 1795; 'Reflections upon Comets which may approach the Earth,' 1773; 'Astronomical Tables for the Meridian of Paris,' 1770; 'Portable Logarithms,' 1802; 'Treatise on the Tides,' 1781; 'Journey to Mont Blanc,' 1796.

The whole of the papers of Lalande in the Memoirs of the Institut were contributed between the years 1751 and 1806. Of these the most important are: 'On the Parallax of the Moon, and its Distance from the Earth,' 1752-53-56-87; 'On Secular Equations, and on the Mean Motions of the Sun, Moon, Saturn, Jupiter, and Mars,' 1757; 'On the Theory of Mercury,' 1766-67-68-86; 'On the Solar Spots and Rotation,' 1776-78; 'On Herschel's Planet,' 1779-87; 'On the Length of the Solar Year,' 1782; 'Observations of 8000 Northern Stars,' 1789-90. He likewise superintended an edition of the 'Astronomy' of Lacaille, Bouguer's 'Navigation,' Flamsteed's 'Celestial Atlas,' Fontenelle's 'Plurality of Worlds,' and in conjunction with Laplace and others he edited the latter volumes of Montucla's 'History of the Mathematics.'

(Delambre, *Eloge de Lalande*, in the 'Memoirs of the Institut,' 1807, and notice of his life in the 'Biog. Univers.;'

Hutton's *Mathematical Dictionary*; Quérard's *Dictionnaire Bibliographique*.)

LAMA. [LLAMA.]

LAMA, LAMAISM, is the name given to the Buddhist religion in Mongolia and Tibet. Lama in these languages properly means priest, but is only applied to those persons who enjoy the higher dignities of the Buddhist hierarchy. It first became an illustrious appellation after the conquests of the Mongols under Genghis Khan and his successors had elevated the individual who pretended to be the successor of Buddha to the dignity of Dalai Lama. [DALAI LAMA.] The name was first confined to eight subordinate chiefs, who were appointed to act as his council, but was afterwards extended by the Dalai Lama to all other priests who possessed a certain degree of authority. The title of Lama is given to the head of every monastery, and every Lama is considered a vicar of the deity, and requires implicit obedience to all his commands, like the Dalai Lama himself. The opinions of this sect are fully developed in the article BUDDHA; and their religious rites and ceremonies resemble those of the BONZES in Japan.

LAMANTIN. [WHALES.]

LAMARCK, JEAN BAPTISTE PIERRE ANTOINE DE MONNET, CHEVALIER DE, member of the antient Academy of Sciences, and afterwards of the Institute. This celebrated botanist and zoologist was born 1st August, 1744, at Bazentin in Picardy, of a noble family. He was originally destined for the church, and received his education at the Jesuits' College at Amiens, where he was noted for that assiduous application to study which had so great an influence over his future career. Being desirous however at that time to follow the profession of his ancestors, at the age of seventeen he left college and entered the army, in which he served under Marshal Broglie in the long war against the English and Dutch. He greatly distinguished himself by his bravery, but accident turned his talents into another channel; for, being wounded and suffering from ill health, he was obliged to quit the military service. He then went to Paris to study medicine, but it does not appear that he ever did anything in that science, for we find him turning his attention to natural philosophy, and in 1778 he communicated to the Academy of Sciences some observations on the laws which regulate the formation and dispersion of clouds. The Academy engaged him to prosecute his researches on this subject, but he now commenced another branch of science which conducted him rapidly to celebrity, namely botany. At this time Bernard de Jussieu was engaged in arranging the plants of the Jardin du Roi, according to their natural affinities; and at the same period the ingenious but artificial system of Linnæus was at its height of popularity. M. Lamarck undertook to form a new arrangement, which should be intermediate between the others, selecting the most easily reconciled parts of both; he also borrowed from the older system of Tournefort, who formed the principal characters of his classes and orders on the modifications and form of the corolla. Lamarck thus constructed a new method of classification, according to which he arranged all the known species of plants indigenous to France. He named this work the 'Flore Française,' and presented it to the Academy of Sciences, who were highly pleased with it. The work particularly attracted the attention of Buffon, who had sufficient influence to get it published at the expense of government for the benefit of the author, whose circumstances at that time were narrow. The 'Flore Française' appeared in 1780, bearing the date of 1778, in 3 vols. 8vo. In 1779 Lamarck was elected a member of the antient Academy of Sciences. In his 'Flore' he announced that it was his intention to set about a general work on plants, and accordingly he commenced collecting materials for that purpose, and chance threw in his way several rich herbaria, among others that of Sonnerat. Having a great wish to travel over France and Europe, he obtained an appointment, through the influence of Buffon, to visit the different botanic gardens and celebrated collections of plants in Europe, for the purpose of procuring curious and rare specimens for the Jardin du Roi. Buffon's son accompanied him, and they travelled through most of Germany and the Low Countries. On his return to Paris he continued to cultivate botany with the same ardour as before, and was admitted to the botanical excursions of J. J. Rousseau, on condition that he should not appear to take any notice of either the person or actions of that extraordinary man, whose temper was so irritable that he was annoyed by the slightest circumstance. He now commenced arranging the results of his researches, but instead of forming a separate work they received another destination; for Pankouke having formed the plan of the 'Encyclopédie Méthodique,' engaged the most learned men in each department, and Lamarck, who undertook the botany, was one of the first contributors, and among the most active, for in 1783 his first volume was ready for publication, containing a history of botany, preceded by an introduction to the science: this composition, though good in some respects, shows marks of the precipitation with which it was written. He rapidly continued the work: a second volume appeared in 1788, and everything promised a speedy completion of the subject, when the publisher proposed to M. Lamarck to execute a series of plates to illustrate the different genera of plants. These appeared arranged according to the Linnæan system, though contrary to the wish of the author. It was the original intention that each fasciculus of plates should have been accompanied with explanatory letter-press, but this only appeared with the first; nine fasciculi of plates came out, but they were never completed. The publication of the 'Encyclopédie' was now arrested by the breaking out of the Revolution, and with this event Lamarck's botanical labours ceased.

In 1788 Lamarck had been appointed assistant to Daubenton in the 'Cabinet du Jardin du Roi,' where he was particularly intrusted with the charge of the vegetable department. Here nothing could disturb him from his peaceful occupations and studies, and he remained unmolested amidst all the troubles and horrors of the Revolution. During the reign of terror he proposed a plan for organizing the Museum, and though little attention was paid to it at the time, he had afterwards the satisfaction to see it realized in the establishment of the institution of the Museum in 1793. But notwithstanding his talents and labours, Lamarck was near being forgotten among the professors of the new institution. Botany was the only science which he was well qualified to teach, and in this department Desfontaines and Jussieu were appointed to the new chairs. The subject of zoology only remained, to which, with the exception of conchology, Lamarck had paid little attention. This branch was divided into several sections; the vertebrated animals were given to M. Etienne Geoffroy, since known as the illustrious Geoffroy Saint-Hilaire, who afterwards shared this department with M. Lacépède, who was then absent and persecuted: the latter undertook the reptiles and fishes. The remaining classes of the animal kingdom, comprising all the invertebrata, which were then considered of little interest, were left to Lamarck, who, putting forth all his zeal in their investigation, and all his talents in their classification and description, has shown that they are almost as complicated in structure and interesting in history, and incomparably more numerous, than the beings higher in the scale of creation. The 'Systême des Animaux sans Vertébres,' published in 1801, was the fruit of his profound researches, and laid the foundation of his greater work, the 'Histoire Naturelle des Animaux sans Vertébres,' published at Paris from 1815 to 1822, in 7 vols. 8vo. This is the most valuable of all his labours, and ranks among the first modern works on natural history. Lamarck commenced his lectures in the Museum in 1794, being then fifty years old, and he continued to deliver them up to 1818, when, becoming almost blind and very infirm, he was obliged to resign, and was replaced by one of his colleagues in the Institute, M. Latreille. His eyes becoming affected during the compilation of his last work, the 'Mémoires sur les Coquilles,' published in the 'Annales des Museum,' he was assisted in the bivalves by M. Valenciennes, and in the remaining classes by his eldest daughter Mademoiselle Lamarck. This celebrated man died in Paris, in December, 1829, at the advanced age of eighty-six.

Lamarck is chiefly known in this country by his excellent arrangement of the Conchifera, or Testaceous Mollusca, in which department he made so great a change, that he has left comparatively little to be done by those who come after him. Mr. Swainson observes that 'the system of Lamarck, in regard to the soft or invertebrate animals, deserves particular attention, since he was unquestionably the first who, by his unrivalled perception of natural affinities, obtained an indistinct view of that circular arrangement which was more clearly and fully developed by his successors in this intricate field of inquiry,' particularly by Mr. MacLeay. But though we admire the talents, judgment, industry,

and extensive knowledge which this able naturalist possessed, we must regret the absurd and fanciful theories which he introduced into his writings and lectures. He supposed that all organized beings, from the lowest to the highest forms, were progressively developed from similar living microscopic particles. This may be called the theory of metamorphosis, according to which a formative substance is held to exist, but is allowed to change its form in order to be converted into a new being. He was also an advocate of the doctrine of spontaneous generation; and, according to his theory, it was only necessary to suppose a soft gelatinous mass of amorphous but organic matter to become traversed by surrounding fluids in order to produce a permanent living movement or growth; if the mass was destitute of irritability it became the type of vegetable life, if it possessed that property, animal. Afterwards he pretended that use and circumstances determined the existence of new organs, which rendered the beings more or less perfect. These principles are only a continuation of those which Maillet and Buffon had before promulgated.

In his great work he adopts the same theories: he divides the animal kingdom into three classes, the 'Apathiques,' the 'Sensibles,' and the 'Intelligents;' and after having followed the order of progression by which nature conducts the different beings to perfection, he regards intelligence solely as the expression of the will of the supreme being. These theories are inconsistent even with his own words, and are almost too ridiculous to be repeated. Lamarck wrote many other works and papers. (*Biographie des Hommes Vivants; Biographie Médicale*, in the *Dictionnaire des Sciences Médicales*, &c.)

LAMB. [SHEEP.]

LAMB, CHARLES, was born February 18, 1775, in Crown Office Row, Inner Temple. His father was clerk to Mr. Salt, one of the benchers of the Inner Temple, and both master and servant (the latter under the name of Lovell) have received honourable commemoration in the 'Essays of Elia.' Born in the Temple, Lamb was educated at Christ's Hospital. Thus his early life was spent in the most old fashioned and busy parts of London: a circumstance which probably exercised a strong influence over his character and habits. For though many passages in his works indicate a lively power of relishing the beauties of inanimate nature (see for example his *Letters*, vol. i., p. 221) his relish was as of a luxury, to be enjoyed distantly, and at intervals: his cravings were for the excitement of society, the splendours, oddities, and squalidness of the metropolis. This feeling breaks out everywhere in his 'Letters.' 'I often shed tears,' he says, 'in the motley Strand, for fulness of joy at so much life.' (See vol. i., p. 182, 213, &c.) Coleridge was his school-fellow, and thus was laid the foundation of a friendship which endured through life. Labouring under an impediment of speech, which prevented his succeeding to an exhibition in one of our universities, Lamb was driven for subsistance to the uncongenial labours of the desk: he became in 1792 a clerk in the accountant's office in the India House, in which, rising in place and salary, he continued a regular labourer till March, 1825, when he was allowed to retire upon a handsome pension. His printed works, he says somewhere, were but recreations: his real ones being contained in some hundred volumes on the shelves of Leadenhall Street. But strongly as he felt, almost to repining, the irksome bondage of his daily duties, he was duly sensible of the value of a certain income and a fixed employment: and earnestly dissuaded one of his valued friends from exchanging the drudgery of a commercial life for the precariousness of a dependance upon literary labour. His own feelings on obtaining his liberty are beautifully recorded in 'The Superannuated Man,' one of the the 'Last Essays of Elia.' Being unmarried, he dwelt through life with an only sister, to whom he was linked by a community of tastes, and by the strongest ties of affection. He died in consequence of an accident, apparently trifling, December 27, 1834.

Lamb's first appearance as an author was in a small volume of poems published jointly with Coleridge and Lloyd. This association brought on him the wrath of the 'Anti-Jacobin;' as did his drama of 'John Woodvil,' published in 1801, the heavier fire of the 'Edinburgh Review.' An increasing relish for our older poets, and for those who in our own day have sought inspiration from them, or from nature herself, has caused the beauty and feeling of Lamb's poems to be better appreciated. Still his popularity depends more on his prose writings; and especially on his 'Essays of Elia,' which were begun in the 'London Magazine,' and collected afterwards in two small volumes. They abound in references to the author's character, history, and habits; and with the two volumes of Letters, lately published by Sergeant Talfourd, present a minute and most interesting picture of a mind quaint, humorous, full of high and lovely thoughts and feelings, and affection for all things animate, and more indulgent to the weaknesses of others than its own frailties. The preface to the 'Last Essays of Elia' is an exquisite sketch, by himself, of his own character.

His works are contained in two vols. 12mo., 1818, 'Essays of Elia, Album Verses,' &c., 1830; 'Specimens of English Dramatic Poets who lived about the time of Shakspeare,' 1808. They have recently been republished by Mr. Moxon, the poems in one, the prose in three volumes. The 'Farewell to Tobacco' and the 'Essay on Roast Pig' are admirable specimens, in verse and prose, and in widely different styles, of his peculiar and easy humour. 'Christ's Hospital Thirty-five Years ago;' 'The Old Benchers of the Inner Temple;' 'Blakesmoor,' &c., show his power of throwing a charm round things indifferent in themselves, but endeared to him by early association. As specimens of his criticism we may instance his essays 'On the Genius of Hogarth,' and 'On the Tragedies of Shakspeare.' His serious is no less admirable than his humorous vein, and is always pregnant with some healthy and benevolent moral. We doubt whether his works are yet, or will be, widely popular: for there was an original quaintness in his character, nourished by his habits and studies, which those only who have something similar in their temper and pursuits will fully relish. Few however have enjoyed so fully the affectionate admiration of a large and varied circle of friends: and having with them encountered and surmounted much ridicule, he will hold an honourable place in our literature along with Coleridge, and others yet living, whose friendship, in life, he regarded among his most precious privileges, and with whom he would be best pleased to be associated in fame.

LAMBALLE. [CÔTES DU NORD.]

LAMBARDE, WILLIAM, an eminent lawyer and antiquary, was the son of John Lambarde, an alderman of London, and was born October 18, 1536. Of his early years we know nothing, till in 1556 he entered at Lincoln's Inn as a student. Here he studied under Lawrence Nowel (the brother of Dean Nowel), a person eminent for his knowledge of antiquities and of the Saxon tongue, from whom Lambarde imbibed the notion that an acquaintance with the customs and jurisprudence of the Saxon times would be useful to him in his profession. The first fruits of his studies appeared in a collection and translation of the Saxon laws, under the title of 'ΑΡΧΑΙΟΝΟΜΙΑ, sive de Priscis Anglorum Legibus Libri,' 4to., 1568, afterwards republished in 1644 by Abraham Wheloc, with Bede's 'Ecclesiastical History.' In 1570 we find him residing at Westcombe, near Greenwich in Kent, of the manor of which he was possessed, and where, without giving up his profession of the law, he devoted much of his labours to the service of the county. His 'Perambulation of Kent,' finished in 1570, was published in a small quarto volume in 1576. In 1574 he founded an hospital for poor persons at East Greenwich in Kent, said to have been the first founded by a Protestant. In 1578 he was admitted a bencher of Lincoln's Inn, and in 1579 was appointed a justice of the peace for the county of Kent, an office which he not only performed with diligence and integrity, but endeavoured to explain and illustrate for the benefit of other magistrates in his 'Eirenarcha, or the Office of the Justices of the Peace,' in four books, 4to., 1581; between which year and 1619 it was reprinted eleven times. He also published a small treatise on 'The Duties of Constables,' &c., 8vo., 1582, which was reprinted six times. In 1592 he was appointed a master in chancery by Sir John Puckering, lord-keeper, and in 1597 keeper of the rolls and house of the rolls in Chancery-lane, by Sir Thomas Egerton, lord-keeper, and in 1600 keeper of the records in the Tower. He died at his house at Westcombe, August 19, 1601, and was buried in the parish church of East Greenwich. The monument placed over him, upon the rebuilding of that church, was removed to the parish church of Sevenoaks in Kent, where is still the seat and burying-place of his family. Lambarde's 'Archeion, or a Discourse upon the High Courts of Justice in England,' was not published till 1635 by his grandson Thomas Lambarde: another work,

originally intended as a general account of Great Britain, he relinquished upon finding that Camden was engaged upon the same project. The materials which he had collected for it were published in 1730, in 4to., under the title of 'Dictionarium Angliæ Topographicum et Historicum.' Lambarde was one of the most accurate antiquaries of his day, and in all respects a man of learning and worth.

(Nichols's *Bibl. Topogr. Brit.*, No. xlii.; Chalmers, *Biogr. Dict.*, vol. xix., pp. 473-475.)

LAMBERT, JOHN, is said to have been born of a good family, probably about 1620, and to have been educated for the bar. On the breaking out of the contest between the king and the parliament, he abandoned the study of the law, and joined the parliamentary army, in which he is mentioned as holding the rank of colonel at the battle of Marston Moor (2nd July, 1644). After distinguishing himself at Naseby, with Cromwell in Scotland, at Worcester, and on other occasions, and rising to the rank of major-general, the appointment of Fleetwood on the death of Ireton (November, 1651) to the chief command of the forces in Ireland produced an alienation between Lambert and Cromwell which was never wholly healed, although he was one of the officers whom Cromwell summoned in June, 1653, to take upon them the settlement of the government, and he was in May, 1655, appointed by the Protector one of his eleven major-generals, as they were styled, or commanders of the military forces in the several districts of the kingdom. Lambert's district comprehended the five northern counties of Durham, Cumberland, Northumberland, Westmoreland, and Yorkshire. He took little part in public affairs, however, during the life of the Protector. The most important part of Lambert's career is comprised within the space of about twenty months that elapsed between the death of Oliver Cromwell and the return of the king. He became the soul of the confederacy of discontented officers, which after the meeting of his first parliament, in January, 1659, was formed against the new protector Richard, and which speedily effected the deposition of that feeble and unambitious personage. [CROMWELL, RICHARD.] Lambert was now accounted the head of the Fifth-monarchy Men, or extreme republican and Independent party. On the breaking out of the Royalist insurrection in July, he was sent by the Rump Parliament to suppress it, a business which he performed with extraordinary vigour; but immediately after his success he turned round upon the parliament, and, on its resistance to his demands, dispersed it by military violence, 13th October. The part taken by Monk however, and the falling away of their partisans on all hands, soon reduced Lambert and the cabal of officers, or Committee of Safety, as they called themselves, to extremities; and by the beginning of January, 1660, having been deserted by almost the whole of the force with which he had set out for the north to encounter Monk, he was seized by orders of the restored parliament and committed to the Tower. On the 9th of April following he made his escape from confinement, to the infinite consternation of Monk and the Council of State; but the activity of Colonel Ingoldsby recaptured him at Daventry, on the 22nd of the same month, when he was already at the head of a considerable body of horse, the greater part of which however deserted him at the critical moment. He was excepted from the Act of Indemnity passed after the Restoration; but although he was in June, 1662, brought to trial before the Court of King's Bench along with Sir Harry Vane, he was, after being found guilty, reprieved at the bar, the distinction made between the two prisoners being expressly placed by the judges to the account of his comparatively dutiful and submissive behaviour in the course of the trial. He was eventually banished to the Island of Guernsey, where he lived for above thirty years.

LAMBETH, a large parish, a portion of which, together with portions of the parishes of St. Giles's, Camberwell, and St. Mary, Newington, constitute a parliamentary borough. It is in the eastern division of the hundred of Brixton and county of Surrey. It is situated on the right bank of the river Thames. The name is of Saxon origin, and signifies, according to Camden, 'a dirty station.' The Saxon kings had a mansion here, where they occasionally resided. The palace of the archbishop of Canterbury, which is situated near the river, exhibits specimens of the architecture of various ages. The chapel and crypt beneath were probably built by archbishop Boniface as early as the year 1262, but the other parts of the building are of more recent date. Within the last five or six years the palace has been repaired under the direction of Mr. Edward Blore. In the dining-room are the portraits of all the archbishops who have filled the see from Laud down to the present time. The library occupies the four galleries over the cloisters, which form a small quadrangle. During the civil wars the greater part of the books were removed to the university of Cambridge, and the others dispersed among private individuals. After the Restoration exertions were made to effect their complete restoration, which were in a great measure successful. At the present time there are about 25,000 volumes, some of which are of great rarity. Many of the manuscripts are valuable, and those which contain the registers of the see of Canterbury are in an excellent state of preservation. Before the Reformation the archbishops had prisons here for the punishment of ecclesiastical offenders, and it was here that Elizabeth confined the earl of Essex before sending him to the Tower.

In the year 1831 the parish contained a population of 87,856 persons, having been increased during the previous ten years by 30,218 persons. The manufactures are numerous and important, comprising those of soap, white and red lead, plate-glass, patent shot, besides extensive breweries, distilleries, &c. There is a parochial school erected in 1808, the Philanthropic Society's school, another belonging to the Benevolent Society of St. Patrick, and many other charitable institutions.

Lambeth was constituted a parliamentary borough by the Reform Act, and returns two members.

For an account of the antiquities of the parish the reader is referred to the *Bibliotheca Topographica Britannica*, vol. ii.; and Lysons' *Environs of London*, vol. i.

LAMBRUS, Leach's name for a genus of brachyurous crustaceous decapods. [PARTHENOPIANS.]

LAME'GO, a town of Portugal in the province of Beira, situated about two miles from the south bank of the Douro, and at the foot of the Serra de Peinde, which is an offset of the ridge of Alcoba. It is a bishop's see, has an antient cathedral, built by Count Don Enrique, father of Alfonso I., several other churches and convents, an hospital, and 9000 inhabitants. The town is built in great part on the slope of a hill; the lower part contains one wide and nearly level street: the cathedral and the episcopal palace and gardens are in the upper town. Lamego is the chief town of the comarca of the same name, which extends from the Douro southwards to the Vouga, which divides it from the comarca of Viseu. This district is hilly, and contains several valleys, through which various streams flow northwards into the Douro. The Serra de Montemuro, which joins the Serra de Maraom on one side and the Serra de Alcoba or Caramula on the other, crosses the country from north-east to south-west. The county produces abundance of good wine, which is sent to Oporto, under the name of Alto-Douro wine. It was at Lamego that the first Cortes of Portugal were assembled in 1143 by Alfonso I., to establish the fundamental laws of the Portuguese kingdom. [CORTES.]

Alfonso is said to have claimed a divine right to the throne, asserting that, the night before the battle of Ourique, he had had a vision of the Saviour, encouraging him to the fight, and promising the kingly crown 'to him and his descendants after him.' (Duarte Galvão, *Chronica do Rei Dom Affonso.*) A document to this effect, signed by the king, two bishops, and eight of the nobility and deputies of the towns, was said to have been discovered in the monastery of Alcobaça in 1596 by Brito, who transcribed it in his 'Chronicles of the Cistercian Order.' Brandão, in his 'Monarquia Lusitana,' Lisbon, 1638, published the acts of the Cortes of Lamego, the genuineness of which has been doubted by some. (*History of the Revolutions of Portugal, with Sir Robert Southwell's Letters concerning the Revolution of* 1667, London, 1740.) By these acts a formal regulation is made as to the transmission of the crown to the lineal descendants of Alfonso, male and female, with a proviso that the eldest daughter of a king should marry none but a Portuguese, lest the kingdom should fall into the hands of a foreigner. It was also decreed by the Cortes, and assented to by Alfonso for himself and his successors, that Portugal was a free and independent kingdom, and that no king or prince of Portugal should ever acknowledge himself as tributary to a foreign power, for if he did, he should lose all right to the throne. (Lemos, *Historia General de Portugal*, b. ix.)

Lamego is 70 miles north-east of Coimbra, 25 north of Viseu, and 45 east of Oporto. A good road has been made

between Lamego and Oporto at the expense of the Oporto Wine Company. (Miñano, *Diccionario Geografico;* Flores, *España Sagrada;* Kinsey, *Portugal Illustrated.*)

LAMELLA'RIA. [PLEUROBRANCHUS.]

LAMELLIBRANCHIA'TA, M. De Blainville's third order of *Acephalophora* (Acéphales Testacés of Cuvier).

M. De Blainville makes this order consist of the following families:—1st. *Ostracea* (Oysters, &c.); 2nd. *Subostracea* (Spondylus, &c.); 3rd. *Margaritacea* (Vulsella, Malleus, &c.); 4th. *Mytilacea* (Mussels and Pinnas); 5th. *Polyodonta*, or *Arcacea;* 6th. *Submytilacea* (Anodon, Unio, Cardita); 7th. *Chamacea;* 8th. *Conchacea;* 9th. *Pyloridea;* 10th. *Adesmacea* (Pholas, Teredo, Fistulana, &c.).

M Rang separates the order into two divisions.

1st. Monomyaria.

Families:—1st. Ostracés, Cuvier (*Ostreadæ*); 2nd. Pectinides, Lam. (*Pectinidæ*); 3rd. Malléacés, Lam. (*Malleïdæ*); 4th. Aviculés (*Aviculidæ*).

2nd. Dimyaria.

Families:—5th. Arcacés (*Arcadæ*); 6th. Mytilacés (*Mytilidæ*); 7th. Submytilacés (*Submytilidæ:* freshwater—Anodon, Unio, &c.; Naiades of Lamarck and Lea; marine—*Cardita, Cypricardia*, &c.); 8th. Chamacea (*Chamadæ*); 9th. Conchacea; 10th. Pyloridea; 11th. Tubicolés, Lam. (*Aspergillum, Clavagella*, &c.).

The families of this order which have not already been noticed will, for the most part, be treated of under their respective titles. The *Arcadæ* will be found under the title POLYODONTA, and the *Adesmacea* under PHOLAS and other generic names. For the organization see CONCHIFERA and NAIADES.

LAMELLICORNES (Latreille), one of the sections of the order Coleoptera. The insects of this section have five joints to all the tarsi. The antennæ are inserted in a small hollow in front of the eyes, short, usually composed of nine or ten joints, the last of which are large and flat, and open like a fan. [COLEOPTERA, vol. vii., p. 341, fig. 9.] The number of these lamellated joints varies, but there are generally three. The clypeus is usually very large, and the labrum is small and hidden beneath the clypeus. The anterior tibiæ are dentated externally, and the posterior tibiæ are often more or less denticulated. The mandibles of some of the species are membranous.

The larva [COLEOPTERA, vol. vii., p. 340, fig. 1] is soft, of a cylindrical form, or nearly so, and has a large vertical head. There are six small legs attached to the thoracic segments. The body is always bent. When about to assume the pupa state, the larvæ enclose themselves in an oval case formed of particles of earth, rotten wood, or other surrounding substances, which are cemented by a glutinous matter. Some of them live in the ground and feed upon the roots of plants, and others live in decayed animal and vegetable substances, upon which they feed. The perfect insects also feed upon these substances (many of them are found in dung); others feed upon the leaves of plants, or on the flowers.

Latreille divides the Lamellicornes into two great tribes. [SCARABÆIDES and LUCANIDES.]

LAMELLIROSTRES, Cuvier's name for the great family of the *Anatidæ* (Ducks, Geese, Swans).

LAMENTATIONS of JEREMIAH. [JEREMIAH.]

LAMIA'CEÆ, or LABIA'TÆ, a very extensive and important natural order of Exogenous plants, with irregular unsymmetrical monopetalous flowers, and a four-lobed ovary, changing to four seed-like monospermous fruits. It is technically allied so nearly to Boraginaceæ as to differ apparently in little except having regular flowers; but in nature it belongs to a different series of vegetation. The leaves of Lamiaceæ are uniformly opposite, and their stems square or nearly so, and in the greater part of the order the flowers are disposed in short opposite clusters axillary to leaves, and appearing in consequence as if in whorls.

The species are generally aromatic and tonic, a property that is in most cases owing to the secretion of a volatile oil in little cysts or glands occupying the leafy organs. The aromatic qualities are familiar to us in the Sage, Marjoram, Thyme, Basil, and similar plants, commonly cultivated for the service of the kitchen, as condiments; of Lavender, so much valued for its peculiar fragrance; of Mint and Peppermint, well known for their stimulating power, and of many others. Betony, Ground Ivy, Horehound, and others are examples of the bitter tonic qualities of such plants; Rosemary appears to have the specific property of stiffening the hair and encouraging its growth; its oil is that which gives the green colour to bear's grease and such pomatums and Cat-thyme (*Teucrium marum*) and Cat-mint (*Nepeta Cataria*) seem to be genuine feline aphrodisiacs.

Plants of this order are distributed over all the warmer and temperate parts of the world, generally being herbaceous, and never exceeding the size of small bushes. Mr. Bentham has given an elaborate view of their geographical distribution, from which it appears that out of 1714 species 1030 belong to the Eastern hemisphere, and 649 to the Western: 8 only are arctic; 80 inhabit the temperate parts of Europe, 190 Spain, 149 the Himalayan Mountains, and only 157 the equinoctial regions of both the old and new world, and those are chiefly mountain plants.

Linnæus distributed the genera of Lamiaceæ through his Didynamia Gymnospermia and Diandria Monogynia. Writers on the natural system have devised much better modes of arrangement; the most perfect and recent is that of Mr. Bentham, (*Labiatarum Genera et Species*, London, 1832-36, 8vo. 783 pp.)



Leaf and flowers of Salvia pratensis

1, the ovary, upon the four lobes of which a part of the character of the order depends.

LAMIAN WAR. Those cities of Greece which were impatient under the supremacy of the Macedonians regarded Alexander's death as a favourable opportunity to regain independence. In this struggle the Athenians took the lead. They were cordially supported by the Ætolians, both having a private reason for their alacrity in Alexander's avowed design to restore all Greek exiles to their countries. By such a measure the Athenians would have been obliged to cede Samos, part of which they had lately colonized to the expulsion of the former possessors, while the Ætolians had a similar motive in their treatment of Œniadæ. The richer part of the Athenians were very averse to contend again with the power of Macedon; but the poor, who looked to war for pay and plunder, of whom Philip said that war was their peace, and peace their war, carried the point and ambassadors were despatched through Greece to organize a confederacy, in which the Argians, Messenians, and other states of Peloponnesus, with many of the minor nations of northern Greece, joined. The events of this, which is called the Lamian War, have already been related at sufficient length. [ANTIPATER; ATHENS; LEOSTHENES.]

LAMINARITES. Brongniart, classing fossil fuci according to the analogy they offer to recent tribes, uses this term for one species found in the secondary strata of Aix, near La Rochelle.

LAMMAS DAY, the name for the first of August, from

the Anglo-Saxon *Hlaf-mæsse*, loaf-mass or feast, when the Saxons offered an oblation of loaves made from new corn. Brand in his 'Popular Antiquities' speaks of it as still a usage in some places for tenants to be bound to bring in wheat of the year to their lord on or before this day. In the Salisbury Manuals of the fifteenth century it is called 'Benedictio novorum Fructuum.' This day had also the name of the Gule of August, as Pettingal (*Archaeologia*, vol. ii., p. 67) says from the Celtic Wyl, or Gwyl, a festival. (Bosworth's *Anglo-Saxon Dict.*, v. Hlaf-mæsse; Brand, *Popul. Antiq.*, vol. i., p. 275.)

LAMOUROUX, J. V. F., professor of natural history at Caen, was born at Agen in Guienne, in 1779. He particularly applied himself to the study of marine productions, both vegetable and animal, and in 1805 published at Agen some observations on many new and rare species of Fuci. In 1809 he was appointed professor at Caen, where he wrote his 'Histoire des Polypiers Coralligênes flexibles,' which appeared in 1816 embellished with 15 plates, containing 150 figures drawn by the author. Before being printed, this work was presented to the Institute, of which Lamouroux was a correspondent. At first he only described those species of Polypi which were contained in his own collection, but afterwards he included all the species which had been described by other authors. Lamouroux, in his arrangement of these productions, divides them into 56 genera, only 14 of which were known before his time, and 560 species, 140 of which were new: thus, both as to genera and species, this work is the most complete that has been written on this family of animals. Lamouroux wrote several other works; he published, in 1817, a description of a new species or variety of wheat, which has been successfully cultivated in some of northern provinces of France, where it is called '*blé lamma*.' He also wrote a 'Dictionary of Zoophytes,' which forms part of the 'Encyclopédie Méthodique;' it came out at Paris in 1824, in 4to.

This promising naturalist died at Caen, 18th March, 1825, at the early age of 46.

LAMP-BLACK, a kind of fine charcoal prepared from the imperfect combination of certain kinds of fir, containing much resin, and the refuse and residuary resin left by the distillation of turpentine. The furnace chimney is long, and the greater part of it nearly horizontal, and its exit is covered with old sacking; or the smoke containing the charcoal is carried into chambers, where it is also deposited on coarse cloths. The purest lamp-black is procured by the combustion of oils, but that is much too expensive for common use.

Lamp-black is extensively employed as a black colour, and mixed with other pigments.

According to the analysis of Braconnot, lamp-black consists of—

Charcoal . . .	79·1
Pyretin soluble in alcohol .	5·3
Pyretin (black) insoluble in alcohol	1·7
Sulphate of ammonia . .	3·3
„ lime .	0·8
„ potash . .	0·4
Phosphate of lime (ferruginous) .	0·3
Gein . . .	0·5
Sand (accidental) . .	0·6
Water . . .	8·
Chloride of potassum (trace) .	
	100·

According to Reichenbach, lamp-black contains naphthalin also. Pyretin is a peculiar resin, of which there are two kinds. It is owing to the presence of these substances that lamp-black burns with a flame when it is heated, and that it yields empyreumatic oil when subjected to dry distillation.

LAMP, SAFETY. It has been long known that coal-mines, and especially such as are deep, are occasionally infested with a gaseous product, which, on account of its combustible property, is called *fire-damp*, the word *dampf*, meaning, in German, a vapour or exhalation; the chemical name for this gas is carburetted hydrogen [HYDROGEN]; and its properties were first ascertained and its analysis correctly stated by the late Dr. Henry.

Several contrivances had been proposed for safely lighting coal-mines subject to the visitations of this gas, which it will not be necessary to notice: the safety-lamp of Sir H. Davy being the only one which has ever been judged safe, and been extensively employed. In his work on the 'Safety-lamp,' the author states that he first turned his attention particularly to this subject in 1815, when, as he observes, there appeared very little hope of finding an efficacious remedy. The resources of modern mechanical science had been fully applied in ventilation: the comparative lightness of fire-damp was well understood; every precaution was taken to preserve the communications open; and the currents of air were promoted or occasioned, not only by furnaces, but likewise by air-pumps and steam-apparatus.

After some allusions to what had been done by those who preceded him in the inquiry, Davy proceeds to describe the origin and progress of the investigations that led him to the discovery of the principles by which he conceived that flame and explosion may be regulated and arrested.

With these views he began a minute chemical examination of various specimens of fire-damp, by which he confirmed the previous statement of Dr. Henry, that the pure inflammable part of it is carburetted hydrogen gas. He found that it required an admixture of a large quantity of atmospheric air to render it explosive: when mixed with nearly four times its bulk of air it burnt quietly in the atmosphere; with between five and six times it exploded feebly; with seven or eight times the explosion was strong, and when mixed with even fourteen times its bulk of atmospheric air the compound was still explosive. Proceeding with his experiments Davy ascertained that explosions of inflammable gases were incapable of being passed through long narrow metallic tubes; and that this principle of security was still obtained by diminishing their length and diameter at the same time, and likewise diminishing their length and increasing their number, so that a great number of small apertures would not pass explosion when their depth was equal to their diameter. This fact led to trials upon sieves made of wire gauze; and he found that if a piece of wire gauze was held over the flame of a lamp, or of coal gas, it prevented the flame from passing; and he ascertained that a flame confined in a cylinder of very fine wire gauze did not explode even a mixture of oxygen and hydrogen, but that the gases burnt in it with great vivacity.

The experiments to which we have now alluded, served as the basis of the safety-lamp, which we shall now describe, and add some of the inventor's observations respecting it. 'The apertures in the gauze should not be more than $\frac{1}{22}$ of an inch square. As the fire-damp is not inflamed by ignited wire, the thickness of the wire is not of importance; but wire from $\frac{1}{40}$ to $\frac{1}{60}$ of an inch in diameter is the most convenient.

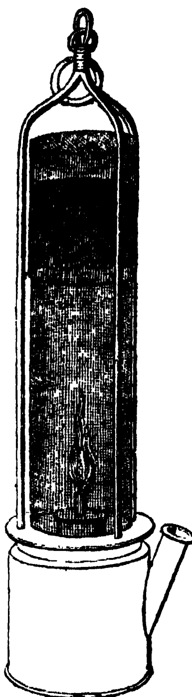
'Iron-wire and brass-wire gauze of the required degree of fineness are made for sieves by all wire-workers; and except when a lamp is to be used by a viewer for dialling, iron-wire gauze is to be preferred: when of the proper degree of thickness it can neither melt nor burn; and the coat of black rust which soon forms upon it superficially, defends the interior from the action of the air.

'The cage or cylinder should be made by double joinings, the gauze being folded over so as to leave no apertures. When it is cylindrical it should not be more than two inches in diameter; for in larger cylinders the combustion of the fire-damp renders the top inconveniently hot; and a double top is always a proper precaution, fixed at the distance of half or three-quarters of an inch above the first top.

'The gauze cylinder should be fastened to the lamp by a screw of four or five turns, and fitted to the screw by a tight ring. All joinings in the lamp should be made with hard solder; and the security depends upon the circumstance that no aperture exists in the apparatus larger than in the wire gauze.'

The annexed figure of the safety-lamp requires but little explanation: the cylinder of wire gauze is defended by three upright strong wires, which meet at the top, and to them a ring is fixed, from which the instrument is suspended. The lamp is screwed on to the bottom of the wire gauze, and is supplied with oil by the pipe projecting from it, when the top is unscrewed and removed. A wire, bent at the upper end, is passed through the bottom of the lamp for raising, lowering, or trimming the wick.

When the lamp is lighted and introduced into an atmosphere gradually mixed with fire-damp, the first effect of the fire-damp is to increase the size and length of the flame. When the inflammable gas forms as much as $\frac{1}{12}$ of the volume of the air, the cylinder becomes filled with a feeble blue flame, but the flame of the wick appears burning



brightly within the blue flame, and the light of the wick continues till the fire-damp increases to one-sixth, or one-fifth, when it is lost in the flame of the fire-damp, which in this case fills the cylinder with a pretty strong light, and when the foul air constitutes one-third of the atmosphere, it is no longer fit for respiration.

The operation of the wire gauze in preventing the communication of flame is thus explained:—Flame is gaseous matter so intensely heated as to be luminous, and the temperature requisite for producing it exceeds that of the white heat of solids. When the flame comes into contact with wire gauze it loses so much heat in consequence of the conducting power of the metal, which conveys it tot hə surrounding air, that it is cooled below the point at which gaseous matter can remain luminous, and consequently the flame of the gaseous matter burning within the lamp is incapable of passing through it so as to set fire to and explode the mixture of fire-damp and air by which it is surrounded; and this cooling power is exerted even though the wire gauze, by effecting it, is rendered and remains red-hot.

Although the inventor of this lamp has expressed himself fully satisfied of its security, yet others have entertained strong doubts on the subject, which have latterly been much strengthened. During the session of parliament for 1835 a committee was appointed to inquire into the 'Accidents in Mines.' The evidence of Mr. Buddle was however strongly in favour of the safety of the lamp; he stated, that for many years he had not less than 1000, and sometimes 1500 lamps in daily use, and that he never knew in one solitary instance an explosion to happen from them; and he mentioned also that he had been with them in all possible varieties of explosive mixtures.

On the other hand abundant evidence, and especially that of Mr. Pereira, was adduced before the committee to show, that in strong currents of explosive mixtures the lamps could not be trusted, as the flame passed through them; indeed Sir H. Davy seems himself to have been aware that an objection might possibly be urged against them on this head, and he proposed the use of a tin shield where such currents occur. It is however probable that currents may happen so suddenly as to prevent the use of a safeguard, which at best must be considered as imperfect and precarious.

While then these lamps may be considered as safe in situations free from currents, the experiments which the writer of this article has witnessed have convinced him that in strong currents they are insecure, even though the wire gauze be not very hot. On this subject we cannot do better than adduce the opinion expressed by the late Dr. Turner, in the last edition of his 'Elements of Chemistry,' which coincides with that of the parliamentary committee:—'If a lamp with its gauze red-hot be exposed to a current of explosive mixture, the flame may possibly pass so rapidly as not to be cooled below the point of ignition, and in that case an accident might occur with a lamp which would be quite safe in a calm atmosphere. It has been lately shown by Messrs. Upton and Roberts, lamp manufacturers in this city, that flame may in this case be made to pass through the safety-lamp, as commonly constructed; and I am satisfied, from having witnessed some of their experiments, that the observation is correct. This then may account for accidents in coal-mines where the safety-lamp is constantly employed. An obvious mode of avoiding such an evil is to diminish the apertures of the gauze; but this remedy is nearly impracticable from the obstacles which very fine wire gauze causes to the diffusion of light. A better method is to surround the common safety-lamp with a glass cylinder, allowing air to enter solely at the bottom of the lamp through wire gauze of extreme fineness, placed horizontally, and to escape at top by a similar contrivance. Upton and Roberts have constructed a lamp of this kind, through which I have in vain tried to cause the communication of flame, and which appears to me perfectly secure; in case an accident should break the glass their lamp would be reduced to a safety-lamp of the common construction. Davy's lamp thus modified gives a much better light than without the glass, just as all lamps burn better with a shade than without one.'

In concluding we heartily adopt the language of the Report by the Parliamentary Committee, that we 'cannot admit that these experiments have any tendency to detract from the character of Sir H. Davy, or to disparage the fair value placed by himself upon his invention. The improvements are probably those which longer life and additional facts would have induced him to contemplate as desirable, and of which, had he not been the inventor, he might have become the patron.'

LAMPORNIS. [TROCHILIDÆ.]

LAMPREY. [PETROMYZON.]

LAMPRI'DIUS, ÆLIUS. [AUGUSTA HISTORIA.]

LA'MPROTES. [TANAGERS.]

LAMPRO'TILA. [KINGFISHERS, p. 232.]

LAMPROTORNIS. [STURNIDÆ.]

LAMPY'RIDÆ (*Lampyris*, Linn.), a family of Coleopterous insects of the section *Malacodermi*. The insects of this family have five joints to all the tarsi; flexible elytra; the body usually elongated and somewhat depressed. The thorax projects more or less over the head; the mandibles are usually small, and terminated in a sharp point; the penultimate joint of the tarsi is always bilobed; the claws are simple, and the antennæ are approximated at the base.

The family Lampyridæ contains the following genera, and some others of minor importance.

Genus *Lycus*, the distinguishing characters of which are —fore part of head prolonged into a snout; antennæ serrated; elytra most commonly dilated in the middle or towards their posterior part. One of the species of this genus is found in England, the *Lycus minutus*, Fab.; it is about a quarter of an inch in length, and of a black colour, with the exception of the elytra, which are brilliant red and have raised striæ.

Genus *Omalisus*, Geoff.: antennæ simple, the second and thirds joints much shorter than the following; head not sensibly prolonged in front; joints of the tarsi elongated and nearly cylindrical; the penultimate joint heart-shaped; elytra tolerably firm.

Omalisus suturalis resembles in colouring and size the insect last described; the suture however is black. It inhabits France.

Genus *Lampyris:* head not produced in front, hidden beneath the thorax; eyes in the male sex very large; antennæ short; females apterous. To this genus belongs the Glow-worm (*Lampyris noctiluca*, L.). This insect is rather more than half an inch in length, of a blackish colour, the thorax is margined with dusky-red, the legs and the edges of the segments of the body of the same colour. The female resembles the male, but is quite destitute of wings, and the terminal segments of the abdomen beneath are yellowish; the thorax is semicircular; the body is very soft, of an oblong form, pointed at the extremity, and composed of ten segments. The male glow-worm is said to emit the phosphorescent light in a slight degree, but it is chiefly the females from which the brilliant light proceeds which we so often see on banks, beneath hedges, and in various other situations. This light proceeds from the under part of the abdomen and near the tip, and it appears that the animal has the power of varying its intensity. Glow-worms will live, we are informed by Latreille, a long time in vacuo, and in different kinds of gases, the nitrous acid, muriatic and sulphurous gases excepted, for in these they soon expire. When placed in hydrogen gas they sometimes detonate. If the luminous portion of the abdomen be removed, it retains its luminous property for some time, and when apparently extinct it may be reproduced by softening the matter with water. The insects emit a brilliant light if immersed in warm water, but in cold water it is extinguished. The females being apterous, and consequently restricted in their powers of locomotion, and the insect being nocturnal, it is supposed that the light emitted by the female is for the purpose of attracting the other sex. The larvæ have been kept alive for a considerable time, by the writer of this article, during which they lived upon snails, killing those of the largest size; sometimes they would seize a snail whilst crawling, and when the ani-

mal retired within its shell, they would still keep their hold, and allow themselves to be carried into the shell with the snail, and although they became enveloped in the mucous secretion, it very seldom appeared to adhere to their bodies. Upon being touched or disturbed in any way they emitted the phosphoric light, but not to so great degree as the perfect insect.

LANARKSHIRE, or CLYDESDALE, is an inland county of Scotland, bounded on the north and north-west by the shires of Stirling and Dumbarton, on the west and south-west by those of Renfrew and Ayr, on the east and north-east by Linlithgow, Edinburgh and Peebles shires, and on the south by the county of Dumfries; being comprised between 55° 15′ and 55° 58′ N. lat., and between 3° 15′ and 4° 19′ W. long. The greatest length of the county, from Queensbury Hill, its southern extremity, to the borders of Dumbartonshire, is 54 miles; its greatest width, from Middlefield in the west to the Pentland Hills, is about 36 miles, and its superficial extent, according to Mr. MacCulloch, is 604,800 imperial acres, or 945 square miles, which nearly corresponds to 475,938 Scotch acres. It is divided into three principal districts or wards, to each of which is appointed a sheriff-substitute for the superintendence of its judicial concerns. The surface of this county is so various, being in some places mountainous, in others hilly, and in others comparatively flat, that it will be most convenient to notice the local peculiarities of each ward under separate heads.

The *upper or southern ward*, of which the antient burgh of Lanark is the chief town, comprises the parishes of Carluke, Lanark, Carstairs, Carnwath, Dunsyre, Dolphington, Walston, Biggar, Liberton, Lamington, Culter, Crawford, Crawfordjohn, Douglas, Wiston and Roberton, Symington, Covington, Pittenain, Carmichael, and Lesmahagow; and includes that extensive portion of the county which lies between the shires of Peebles, Dumfries, and Ayr. It constitutes more than one-half of the county, and consists principally of mountains, hills, and moorish lands, which do not appear susceptible of much improvement. Mr. Naismith, in 1794, estimated the surface as follows:—

	Scotch Acres.
Moor pasture	185,000
Woods	3,140
Channels of rivers, brooks, roads, &c.	2,060
Orchards	70
Arable and meadow	76,490*
	266,760

The geology and mineralogy of this part of the county are important. Rich seams of excellent coal, from two to seven feet in thickness, are advantageously wrought at Wilsontown (parish of Carnwash), and in other parishes of the ward. The Wilsontown coal-field lies in an oval basin bearing north-east and south-west; the dip, about one in seven, is at right angles to the bearing; the veins are intersected by numerous *slips* or *hitches*, which throw the coal down from 30 to sometimes 50 feet perpendicular. In the immediate vicinity of this coal-field are the Wilsontown iron-works, which were conducted with apparent prosperity till the year 1808, when the company by whom they were carried on became embarrassed, and the machinery was permitted to remain idle for many years. This circumstance, which was the source of much distress to the resident population, does not appear attributable to any failure, either in the quantity or quality of the mineral, as it was reported in 1797, by persons employed for that purpose, that 40,000 tons of iron might be made annually for the space of 90 years, and that the supply of ironstone was inexhaustible. Operations have since been renewed under different proprietors, but we are not aware with what success. Freestone (of a beautiful white colour, well adapted for building), whinstone, and limestone, are all abundant and largely consumed. The lead-mines in the parish of Crawford are the most productive in Scotland, and have been continuously worked from a remote period. Gold and silver are disseminated in minute particles through the superincumbent clay, but the quantity is at present too small to repay the expense of its extraction, though formerly it appears to have been otherwise, as there are extant, in the Advocate's Library of Edinburgh, manuscript records, dated in the reign of Elizabeth, which state that specimens of native gold were here sometimes met with weighing from one to several ounces. The present annual produce of these mines is estimated at 700 tons of lead. In the vicinity of the lead-mines a vein of copper was found, and another of antimony, and some attempts made to work them, but, we believe, without success. Among the more elevated mountains of this part of the county are abundant quarries of slate, but their distance from the populous parts of the county precludes them from being extensively worked.

The arable portion of this ward is inconsiderable, and confined to the banks of the Clyde and those of the streams which are contributory to it. The quality is so various, that it is difficult to assign its average rent; where most productive, it lets for 4*l.* the imperial acre, at other parts it will scarcely fetch as many pence. The highest ground is in the parish of Crawford, where the Clyde has its source, and here 'the mountains are so huddled together,' says Mr. Naismith, 'that their grandeur is lost to the eye of a beholder. When he traverses a hollow, only the sides of the nearest mountains are presented to his view, and when he climbs an eminence he sees nothing but a confused group of rugged tops, with the naked rock frequently appearing among the herbage.' The principal elevations are: Tinto in the united parishes of Wiston and Roberton (2310 feet); the range of the Lowthers in the parish of Crawford and near the borders of Dumfriesshire (greatest height 2396 feet).

The *middle ward*, of which Hamilton is the chief town, comprises the parishes of Hamilton, Blantyre, Kilbride, Strathavon, or Avondale, Glassford, Stonehouse, Dalserf, Cambusnethans, or Cammethan, Shotts, and Old and New Monkland; and is about half the extent of the upper ward. In this ward the elevation of the land is considerably diminished, and it continues to decline towards the north-west.

In 1794, according to Mr. Naismith, the surface consisted of

	Scotch Acres.
Moors and coarse pasture	66,000
Woods	4,150
Towns, rivers, and roads	1,300
Orchards	130
Arable	70,750
	142,330

It is much diversified by gently undulating grounds, there being no plains of any extent except in the valley along the banks of the Clyde. The prevailing soil is of a clayey nature intermixed with sand, and varies considerably in colour, composition, and degree of fertility. In some parts, as in the parish of Hamilton, it consists of a deep fertile loam, resting upon a subsoil of loose gravel; in others, as in the parish of New Monkland, it partakes more of a mossy character, and yields, in early seasons, good crops of oats, flax, and rye-grass-hay, but in cold or late seasons the oats do not ripen well. The usual term of leases is nineteen years; some of them however are conditional, and permit the tenant to give up the lease in the event of his not being satisfied at the end of a specified time. Oats and barley form the principal crops, but there is also much wheat raised both in this and the adjoining ward to the north. The farm buildings are greatly improved, but the farms are for the most part small. Farming operations are much better understood than formerly, and draining, the long neglect of which had proved highly detrimental to the soil, is now more generally attended to. Bone-dust manure has been introduced, and is in great request for the cultivation of turnips. The rent of the arable land varies from 1*l.* 10*s.* to 7*l.* an acre.

This ward is also rich in a mineralogical point of view, containing an abundance of whinstone, sandstone, ironstone, and coal. The coal-seams vary from two to nine feet in thickness. The ironstone occurs both in masses and in seams. In the parish of Old Monkland are situated the Clyde iron-works, which are conducted upon a very extensive scale.

The *lower or northern* ward is of very limited extent, but as it contains the city of Glasgow, it is a very important one. It comprises the parishes of Carmunnock, Rutherglen, Cambuslang, Calder, and Govan, and the suburban parishes of Barony and Gorbals. The arable land in 1794 was estimated at 33,850 Scotch acres, the woods and waste ground at 1000 acres, and the remaining 1500 were allotted to towns, roads, &c.

In the parish of Calder are immense fields of fire-clay,

varying from four to nineteen feet in thickness, and the quality is considered fully equal, if not superior, to the Stourbridge clay. In their vicinity are extensive works for the manufacture of crucibles, &c. The soil of this parish is for the most part moist and moorish, but there is a great deal of good soil, which is partly light and sandy, and partly alluvial. Many of the mosses have been already reclaimed, and they are all gradually, and some of them rapidly, lessening by peat cutting, 'so that oats, rye-grass, and even wheat, now grow luxuriantly where once the adder basked, the moor-fowl fed, and the long heath waved.' The *haughs* or valleys of Dalmarnoch are proverbially fertile. (*New Statis. Acct.*) The greater part of the tilled land is sown with oats, which also constitute the chief spring corn. Wheat is sown from the end of August to the beginning of November, and sometimes, though very rarely, in spring. The following is the ordinary rotation in the lower ward:—first year, the land is spring fallowed and well manured, mostly with Glasgow dung; potatoes are planted in drills, and kept clean by summer hoeing; second year wheat is sown as soon as the potatoes are removed, and grass-seeds sown among the wheat in the spring; third year, hay; fourth year, hay and the after-grass pastured; fifth year, lime manure and oats.

Nearly three-fourths of the land of this county belong to large proprietors. The resident owners usually have a certain portion cultivated under their own direction, and a considerable extent of enclosed land is kept constantly in grass, and let out from year to year for pasture. There are many farms, the rents of which amount to 200*l*., and from that to 600*l*. and upwards, but the greater part average from 30*l*. to 150*l*.

Throughout Lanarkshire the dairy system has been prosecuted with great success. The cows are mostly of the Ayrshire breed, and some farmers have from fifteen to thirty. The standing stock of sheep, which are mostly black-faced, is estimated to exceed 120,000, and that of the horses employed in agriculture is supposed to be nearly 9000. The draught horses of this county are held in great estimation in the north of England and throughout the south of Scotland.

The climate of the county is almost as various as its soil. The lower ward, being more open to the sea breezes which prevail from the west and south-west, is comparatively temperate; intense frost is seldom of long continuance, and deep snows are rare. At the same time the elevated lands in the counties of Renfrew and Dumbarton, intercepting the vapours with which the westerly winds are usually saturated, occasion the frequent fall of heavy showers. The barometric and thermometric variations in the middle ward are more uniform, but in the upper ward they are sudden, and there also the climate is unusually severe.

Before the commencement of the last century Lanarkshire was not remarkable either for its commerce or its manufactures, but at the time of the Union a considerable trade was carried on in all the towns and villages of this county in collecting linen yarn for the English markets, and many branches of the linen manufacture had been brought to considerable perfection. The rapid rise however of the city of Glasgow, both in commerce and wealth, has led to the discontinuance of most of the small establishments which were dispersed over the county, and more particularly those which were centrally situated. Those which now exist are rather to be considered as so many branches of the extensive establishments of Glasgow, which city comprehends nearly the whole of the population, manufactures, and commerce of the county. [Glasgow.]

In 1831 the entire population, inclusive of the city of Glasgow, was 316,819, namely 150,229 males, and 166,590 females, distributed among 64,876 families, of whom 4504 were employed in agricultural pursuits, 39,692 in trade, manufactures, and handicraft, and the remaining 20,680 were not comprised in the two preceding classes.

The principal river of the county is the Clyde (the Glotta of Tacitus, *Agric.* c. 23), which in a commercial point of view is probably of more importance than any other river of Scotland. It rises near Queensbury Hill, on the borders of Dumfriesshire, whence its course is nearly due north, passing within two miles of Carstairs House, where it turns suddenly to the south-west, and soon after receives the Douglass Water, near Harperfield. Here it takes a north-west direction, passes within a short distance of the towns of Lanark and Hamilton, flows through the city of Glasgow, and finally falls into the Frith of Clyde a little below Greenock. The entire length of the river, from its source to the city of Glasgow, is between 70 and 80 miles, although the direct distance between those points is less than 50 miles. The contributary streams are the Douglas, Avon, and Calder, besides several others of minor importance. Before the junction of the Douglas with the Clyde, the course of the latter is comparatively tranquil, but afterwards it begins to be precipitated over a succession of falls or cataracts, and dashes along with the impetuosity of a mountain torrent. The first fall, near Bonnington, does not exceed 30 feet; the second is at Corehouse, where it falls through a perpendicular height of 70 feet. Dundaff Fall is 10 feet high, and there are three other falls below Lanark, making together a descent of about 76 feet. After this its descent becomes more uniform; it resumes its former tranquil character, the valley through which it flows widens, and it pursues its course through a well cultivated, rich, and populous country.

The Monkland Canal passes through the royalty of Glasgow, intersects the parish of New Monkland, and terminates at the southern extremity of the parish of Old Monkland. Its length from Glasgow city is about 12 miles, and its original width was 35 feet, but in the year 1834 the banks were raised, which occasioned a considerable increase both in the width and depth of the canal. This canal affords a very cheap communication between Glasgow and the collieries situated in the parishes of Old and New Monkland, and it has hitherto proved a very profitable investment to the shareholders.

The Ardrossan Canal proceeds from Port Eglinton, in the parish of Gorbals, through the parish of Govan, and thence to Johnstone and Ardrossan through the fertile counties of Renfrew and Ayr. The total length from Port Eglinton to Ardrossan is nearly 33 miles; the breadth at the top is 30 feet, and the average depth 4½ feet. The passengers by this canal in the year 1834 averaged 982 daily, and the average fare per mile was four-fifths of a penny.

The roads of this county are in general well constructed, and kept in good repair.

In addition to the roads there is the Kirkintilloch and Monkland railway, which, commencing at Kirkintilloch, passes through the parishes of Calder and Old Monkland, and terminates near Holytown in the parish of Bothwell. One branch of this railway proceeds to Glasgow, and another, called the Ballochney railway, passes the town of Airdrie.

The county returns one member to parliament, the city of Glasgow two, and the boroughs of Lanark, Hamilton, and Airdrie, which, after Glasgow, are the principal towns of the county, unite with Falkirk and Linlithgow in returning one member.

The town of Lanark, distant 32 miles south-west by south from Edinburgh, and 24 miles south-east by south from Glasgow, occupies nearly the centre of the county, of which it is considered the capital. It is generally allowed to be of great antiquity. Kennett II. assembled the states of the realm here in the year 978, and it had been constituted a royal burgh before the time of Malcolm IV. Numerous charters were granted to it by the subsequent Scottish monarchs, all of which were confirmed by the final one given by Charles I., and dated 20th February, 1632. The appearance of the town has been greatly improved within the last ten years, and at the present time there are many handsome houses built of freestone, which is extensively quarried for this purpose in the adjoining parish of Carluke. The chief public buildings are the commercial bank, county hall, prison, parish church, and grammar-school. The grammar-school once enjoyed considerable celebrity as a seminary of education. It is superintended by the rector and an assistant, whose salaries are respectively 40*l*. and 20*l*. The fees are 1*s*. a quarter for writing and arithmetic, 2*s*. 6*d*. for English, and 4*s*. for Latin. There are circulating and subscription libraries. There is a savings' bank, and several friendly societies for affording relief during sickness or want of employment. Fairs are held seven times in the the year for the sale of horses, sheep, and black cattle. The population in 1831 was 1266.

New Lanark is a well built village to the south of the town of Lanark. It stands low upon the right bank of the Clyde, and is completely surrounded by beautifully wooded

hills. It contains a thriving cotton manufactory, originally established by Mr. Dale in 1784, who retired from the concern in 1827. It is now carried on by Messrs. Walker & Co., and the ordinary number of persons employed is 1110, of whom about 60 are mechanics and labourers. The population in 1831 was 1901.

Airdrie is a well-built town in the parish of New Monkland, distant 32 miles west by south from Edinburgh. It possesses the privileges of a royal burgh, and was constituted by the Reform Act a contributary parliamentary borough. The fairs for the sale of cattle are held the end of May and beginning of November. The foundation of a large cotton mill has recently been laid, which is expected to employ a considerable number of the inhabitants in carding, spinning, &c. In 1831 the population of the town was 6594. Besides the parochial school, there are four others in the parish, which have been built by subscription. The parish schoolmaster has a dwelling-house and a garden, and a salary of 30*l.* in addition to his other emoluments, consisting of school fees, &c., which amount to about 60*l.* per annum. Besides a circulating library and reading-room, there is a benevolent institution for the maintenance and education of poor orphans and other destitute children.

Hamilton (antiently Cadzow), a handsome though irregularly built town, is pleasantly situated near the confluence of the Avon Water with the river Clyde, and is 36 miles west from Edinburgh. In 1548 Queen Mary erected it into a free royal burgh, but the rights and privileges thus acquired from the crown were subsequently resigned into the hands of the duke and duchess of Hamilton, who, in 1670, made it a burgh of regality, dependent upon them and their successors, in which state it still remains. Hamilton Palace is a very superb building, and contains many valuable paintings; but for an account of these and the other antiquities of the place, which are numerous and interesting, the reader is referred to the 'New Statistical Account of Scotland.' The revenues of the town are considerable, and are derived chiefly from lands and other property within the burgh. Gas-works for the supply of the town were erected in 1831, at an expense of 2400*l.*; and subsequently attempts have been made to establish a company for supplying the town with water, as also to bring the Police Act into operation, which latter measure was however outvoted by the majority of the inhabitants.

The antient grammar-school of Hamilton is in great repute, and to its influence may be attributed the superior civilisation and love of literary pursuits which are said to distinguish the inhabitants of this place. The schoolmaster receives a salary of 34*l.* 4*s.* in addition to his fees, which, on an average, amount to 50*l.* The fees for Latin are 7*s.* 6*d.* per quarter, and an additional 3*s.* for Greek. The number of scholars in 1834 was thirty-five. The other schools in this parish are numerous, and afford education to more than 1000 children. Besides a public library, consisting of upwards of 3000 volumes, there is a Mechanics' Institution, established in 1825. The population of the parish in 1831 was 9513.

(*New Statistical Account of Scotland;* Naismith's *View of the Agriculture of Clydesdale,* 4to., 1794; M'Culloch's *British Empire; Beauties of Scotland;* Carlisle's *Dictionary; Parliamentary Papers,* &c.)

LANCASHIRE, a northern county of England, is bounded on the north by Cumberland and Westmoreland, on the north-east and east by Yorkshire, on the south by Cheshire, and on the west by the Irish Sea. Its form is irregular: the district of Furness, a portion of the county on the north-western side, is separated from the rest by the Bay of Morecambe, and by a narrow strip of the county of Westmoreland. Its greatest length, not including Furness, is from the 'Counties Stone,' at the junction of the three counties of York, Westmoreland, and Lancaster, to the bank of the Mersey, south of Prescott, about 64 miles; the greatest breadth is from Redmer's Head, east of Rochdale, to Formby Point on the Irish Channel, nearly 45 miles. The greatest length of Furness is from the neighbourhood of Ambleside at the head of Winandermere to Rampside, at the western extremity of Morecambe Bay, 23 or 24 miles; the greatest breadth from the Duddon to the Winster about 13 miles. The long narrow island of Walney and some smaller ones are at the southern extremity of this detached portion. The whole county is comprehended between 53° 20′ and 54° 25′ N. lat., and between 2° 0′ and 3° 15′ W. long. The area is estimated at 1766 square miles; the population in 1831 was 1,336,854, giving 757 inhabitants to a square mile. In size it is the sixth county in England, being somewhat smaller than Northumberland, and rather larger than Somersetshire: in population it is exceeded only by Yorkshire and Middlesex; and in density of population it is exceeded by the metropolitan county alone. Lancaster, the county town, is about 213 miles in a straight line north-west of London, or 238 miles by the road through Northampton, Leicester, Derby, Macclesfield, Manchester, and Preston.

Surface and Coast-line.—The inland part of Furness is an integral part of the Cumbrian mountains, and is marked by the features common to that county. Mountains rising to the elevation of between 2000 and 3000 feet are separated by narrow valleys watered by mountain-streams, or occupied by lakes. Towards the coast the mountains and hills subside; there are no cliffs, and in some parts the coast is occupied by bogs, or, as they are provincially termed, 'mosses.' Furness is distinguished into two parts, according to the character of the surface; the mountainous part is Upper Furness; the low flat towards the shore is Lower Furness. In the main portion of the county the northern and eastern parts are occupied by branches from the central high lands which run southward through Yorkshire into Derbyshire. These elevations are not equal to those of the Cumbrian group; but they expand into greater breadth, forming high waste moorlands. In the southern and western parts the high lands gradually subside, leaving between their base and the sea a broad flat belt of land, and on the south sinking into the valley of the Mersey and the wide expanse of the plain of Cheshire. These high lands reach the margin of the sea at Liverpool; but from the mouth of the Mersey northwards to that of the Ribble, a uniform level, containing extensive peat mosses, stretches inland from the flat and sandy coast for several miles. Between the mouth of the Ribble and the Wyre, the Fylde country, as it is termed, forms an extensive tract between the road from Preston to Lancaster and the sea, which is generally level, or has in parts a slightly undulating surface: this district also contains extensive peat-mosses. The level country still borders the sea from the mouth of the Wyre to that of the Lune, and continues along the coast of Morecambe Bay. With the exception of these low lands, and the tract of Lower Furness, Lancashire has a hilly and in some parts a mountainous character. The principal elevations are as follows:—Old Man in Coniston Fells, 2577 feet; another peak, near Old Man, 2577 feet; Pendle Hill, near Clithero, 1803; Bleasdale Forest, on the east border near Garstang, 1709; Boulworth Hill on the east border, near Burnley, 1689; Rivington Moor, near Bolton, 1545.

As the sea forms the western boundary the coast partakes of the flatness which marks that side of the county. Except near Blackpool, where there are clay cliffs extending for about three miles, and in some places more than one hundred feet high, the coast is low throughout, with a sweeping rounded outline, skirted by broad sands dry at low water. The roundness of its outline is particularly observable in the south-western part, where the æstuaries of the Ribble and the Mersey, with the intervening coast, form almost the segment of a circle.

Towards the north, where the high land approaches nearer to the sea, the coast loses its convexity of outline, and forms a deep bay, of which Rossall Point and the southern point of Furness form the extremities. A tongue of low land projecting near the mouth of the Lune divides this large bay into the two smaller ones of Lancaster and Morecambe, the Moricambe of the antients. Lancaster Bay receives the Lune and the Wyre: the æstuaries of the Leven and the Ken, or Kent, open into Morecambe Bay. The depth of water in both bays is little, except in the channels formed by the rivers; and a considerable part becomes at low water an expanse of sand, across which there is a road, passable, though not without danger, when the tide is out, from the neighbourhood of Lancaster into Furness.

The only islands along the coast are off the southern extremity of Furness. Walney Island, the largest, extends from north-west to south-east, about eight miles, in width nowhere more than one. It bends in at each extremity towards the mainland, from which it is separated by a narrow channel

It lies upon a bed of [illegible] or peat, in which [illegible] have been dug [illegible] so low as to have been at times nearly inundated [illegible]. It contains two [illegible] and [illegible] chapel [illegible] to Dalton, in which parish it is. At the [illegible] extremity of the island is a lighthouse. The other islands [illegible] group, Foulney, Pile of Fouldrey (on which are [illegible] remains of an old castle, once extensive and [illegible]), Sheep Island, Roe Island, Dova How, and Old Barrow [illegible], are all small; they are in the channel between [illegible] and the main.

Geological Character; Mineral Productions.—The uppermost of the geological formations which overspread the county is the new red sandstone, or red marls, in which occurs the great deposit of rock salt. This formation occupies the valley of the Mersey, from the bank of which river it spreads inland several miles, especially in the neighbourhood of Manchester. It occupies also a considerable portion of the western side of the county, as far north as the valley of the Lune at Lancaster. It is covered near the coast by the moss or peat which extends to the westward of a line drawn from Liverpool by Ormskirk to Preston; and from Preston by Garstang to Lancaster it is covered by the clays, marls, and peat-mosses of the Fylde district. The peat-mosses contain great quantities of large timber-trees, the remains of antient forests. Some patches of this moss remain in a state of nature, and are unproductive; but the greater portion of the tract in which the peat occurs is in a state of cultivation, and continual progress is made in reclaiming those parts which yet remain in a state of nature. The portion of the county occupied by the red sandstone partakes of the flatness or the slight elevation which characterises that formation generally. The coal-measures crop out from under the red marl. To the coal-field of South Lancashire the county owes its manufacturing pre-eminence. This field occupies a large irregular tract between the Ribble and the Mersey. The line which bounds it extents from Colne south-west by Burnley, Blackburne, and Chorley, to Upper Holland, near Wigan; from thence north-west to near Ormskirk; and from thence south and east by Prescot to between Newton and Warrington. From this point the boundary runs in an irregular line by Newton and Leigh to Worsley; and from thence makes a sweep round Manchester at an average distance of five miles from that town till it meets the river Thame on the border of the county. The eastern limit of the coal-field is, generally speaking, just within that of the county; for the high land which divides Lancashire from Yorkshire is formed of the millstone-grit, which here crops out from beneath the coal-measures. There is every reason to believe that the coal-measures extend west of the limits here mentioned, and descend under the sea. The coal re appears in the peninsula of the Wirral in Cheshire, and yet farther west in the coal-field of Flintshire and Denbighshire. A small coal-field, east of Lancaster, occupies a portion of this county, and extends into Yorkshire. The coal-pits are most numerous about Prescot and Newton, and in the district between these towns; about Wigan and Bolton, about Oldham and Ashton-under-Lyne, and in the neighbourhood of Blackburn and Burnley. The pits in the northern coal-field are chiefly in the neighbourhood of Hornby in Lancashire.

The millstone-grit forms, as already noticed, the heights which skirt the eastern side of the county, as well as those which separate the basins of the Mersey and the Ribble, and the valleys of the Irwell and the Roch. The heights which separate the valleys of the Ribble and the Lune are also formed of millstone-grit. In the intervening space between [illegible] coal-fields the red marl rests upon the millstone-[illegible] the dip of the strata of this formation is generally [illegible] the west; but in some parts, as about Clithero, the strata are more disturbed than is common.

That part of the county which is north of the Lune is chiefly occupied by the carboniferous or mountain limestone. Between Hornby and Lancaster this formation extends over a small district south of the Lune. The old red sandstone, which underlies the mountain limestone, appears just [illegible] county near Kirkby Lonsdale. [illegible] partly by the slate rocks which form [illegible] mountains. Lower Furness is [illegible] carboniferous limestone, which forms [illegible]

[illegible] production of Lancashire is coal. The [illegible] including [illegible]. Lead is obtained, but not in great [illegible] grit and [illegible] limestone districts. [illegible] Anglezark, between Chorley and Bolton, [illegible] nate of barytes. Some copper is obtained in the [illegible] tains of Furness, [illegible] ironstone is found in the [illegible] of the same district between Ulverstone and Dalton. The mountains of Furness yield blue slate, which is [illegible] parts; coarse slate of lighter colour, and flag-stones, are obtained near Wigan. Excellent freestone is quarried near Lancaster, and scythe-stones and brick and pipe-clay are also found in various parts.

Hydrography and Communications.—The rivers that water this county have their general course from north-east to south-west; those of Furness excepted, which flow from north to south. The principal rivers are the Lune in the north, the Wyre and the Ribble in the centre, and the Mersey in the south.

The Lune, or Loyne, rises in the county of Westmoreland. The principal sources are on the northern slope of the Langdale Fells, but the stream is soon increased by affluents from Shap Fells and the moors north of Orton. For a few miles the course of the stream is westward, but on receiving the stream from Shap Fells (by some considered to be its head) it turns southward, and flows through the county of Westmoreland, which in one part it divides from Yorkshire, to Kirkby Lonsdale, receiving several mountain streams. After passing Kirkby Lonsdale it enters Lancashire, through which it flows first south and then south-west past Lancaster, where it opens into a wide æstuary in Lancaster Bay. The Lune receives in the lower part of its course the Greta, which rises on the southern slope of Whernside, and the Wenning, which also rises in the mountains of Yorkshire and flows past the town of Hornby; both these tributaries join the Lune on the left bank. The length of the Lune may be estimated at 46 or 48 miles, of which 20 are in Lancashire. Lonsdale, or the Valley of the Lune, is equalled by few vales in England in picturesque beauty. The navigation of the river commences at Lancaster, up to which town it is navigable for ships of small burden.

The Wyre, or Wyer, rises in the moorlands on the Yorkshire border east of Lancaster, and flows first west and then south by Garstang, below which it turns west and then north-west until it enters the bay of Lancaster near Rossall Point, by a deep and wide æstuary. Its whole course may be estimated at 26 or 28 miles. A harbour is in process of formation at the mouth of the Wyre, which it is expected will be, in several respects, superior to any on the Lancashire coast, and a new town, called Fleetwood, is partly built.

The Ribble rises in the Yorkshire mountains, a little to the east of Whernside, and flows in a direct line south through a narrow valley, to below Settle in Yorkshire. It then flows first south-east and then south-west to the border of Lancashire, which it joins about two or three miles above Clithero. After dividing the counties of York and Lancaster for some miles, it enters the latter county, through which it flows in a somewhat sinuous course, but still preserving its general south-western direction to the town of Preston, below which it opens into a wide shallow æstuary, and enters the Irish sea. It does not receive any important affluent until it reaches the border of Lancashire, when it is joined on the right bank by the Hodder, which rises very near the source of the Wyre, and has the upper part of its course in Yorkshire, and the lower part on the border of Yorkshire and Lancashire. Just after its junction with the Hodder, the Ribble receives on its left bank the Calder, which rises just within the boundary of Yorkshire, but has the greater part of its course in Lancashire. Still lower down, in the neighbourhood of Preston, it receives on the left bank the Darwen, or Derwent, which rises in the moors near Over Darwen between Blackburn and Bolton. The Ribble's Dale, or Valley of the Ribble, is very beautiful. The æstuary is forded at low water at Hesketh Bank below Preston, where it is four miles wide; but with the tide small vessels can get up to near Preston.

The Mersey rises in Yorkshire, from different sources in Clough Moss and Holme Moss south-west of Huddersfield. The streams from these sources form the Thame, or Tame, which flows south-west first through Yorkshire and then along the border of Lancashire and Cheshire, by Stayley Bridge and Ashton-under-Line to Stockport, where it is joined by the Goyt [Derbyshire] and [illegible] of Mersey. The lower part of its course [illegible] where. [Cheshire.] The navigation of the [illegible]

at Stockport. Its principal Lancashire tributary is the Irwell, which has its source in Deerplay Hill, in the moors between Rochdale and Burnley, and flows in a very winding course by Heywoodbridge near Haslingden, Bury, and Manchester. At Manchester it receives the Irk, from between Oldham and Rochdale, and the Medlock from the Yorkshire border near Oldham. The Irwell is navigable as far as Manchester. The whole length of the Irwell may be estimated at 40 miles: that of the Tame or Mersey, including its estuary, at nearly 70 miles.

There are several small streams in the county. The Winster and the Duddon form respectively the eastern and western boundaries of Furness: and the Leven from the lake of Winandermere, and a stream from Coniston Water, flow through the middle of Furness and unite their waters in the wide estuary of the Leven. The Duddon is a beautiful stream; its valley is called Dunnerdale. It rises north of Coniston Fells, and sweeps round and under them.

The Douglas rises near Wigan, and flows north-west into the estuary of the Ribble. The Alt, or All, rises near Prescot and flows north-west into the Irish Sea near Formby Point. The Douglas is 20 miles long, the Alt about 13 or 14: the former was made navigable nearly throughout as far back as the year 1727, but many years since, an artificial cut was substituted for the natural channel, except for a short distance near the mouth.

There are in Furness two considerable lakes, Winandermere or Windermere and Coniston Water. Winandermere is on the border of Westmoreland and Lancashire, but by its position rather belongs to Lancashire, within which its southern part is included. It is about eleven miles long from north to south, and varies from half a mile to a mile in breadth, but in one part (where there is a ferry) it is not above five hundred yards over. It is the largest lake in England, and its greatest depth is rather more than 200 feet. At its northern extremity it receives two mountain streams from Langdale Pikes, which unite just before they enter the lake: several other mountain streams flow into it on the east and west: its waters are discharged by the Leven, which flows from its southern extremity into Morecambe Bay. A small lake, Esthwaite Water, in Lancashire, discharges its waters into Winandermere, to the west of which it lies. The waters of some of the smaller Westmoreland lakes also flow into this great receptacle. The waters of Winandermere are beautifully clear, on which account it has been suggested that its name is derived from the Celtic Gwyn-lyn-dwr, 'the clear ... antient lake.' There are several small islands in it.

Coniston or Thurston Water is only six miles long from north to south, with a variable breadth never perhaps exceeding three quarters of a mile. Its greatest depth is about 240 feet. It is fed by a number of mountain streams, and discharges its waters into the estuary of the Leven. Coniston Fells are near the northern extremity of the lake.

There are some shallow lakes or morasses along the western coast of Lancashire, as Martin Mere, between the Ribble and the Wyre, which is now considerably reduced by the channel called the Main Dyke, and White Otter, and Barton Mere, not far from Ormskirk. Martin Mere, near the mouth of the Douglas, has been drained and brought, at least in a great degree, into cultivation.

Canals. The Sankey Canal was the first executed in England. The act of parliament for it was obtained in 1755. It extends from St. Helen's near Prescot along the valley of the Sankey brook into the Mersey at Fiddler's Ferry near Warrington. It has a very circuitous course of about twelve miles, with three branches.

The Duke of Bridgewater's Canal was commenced soon after the Sankey Canal. The act of parliament under which it was commenced was obtained in 1759. An act had been obtained several years before, but nothing had been done under it. The execution of this great work was effected by Francis, duke of Bridgewater, assisted by Brindley the engineer. The original design was, by a canal from Worsley (between Leigh and Manchester), where the duke had some valuable collieries, to Manchester, to supply the town of Manchester with coal at a cheaper rate than by the imperfect navigation of the Mersey and the Irwell. The canal from Worsley (where there are extensive tunnels and underground works connected with the duke's collieries) to Manchester was completed by the year 1762. The duke now enlarged his views, and by successive acts obtained power to make a canal from the neighbourhood of Manchester into the Mersey, which he effected; but this work chiefly belongs to Cheshire. [Bridgewater, Francis Egerton, Duke of; Brindley, James; Cheshire.] The duke's canal was afterwards extended from the Worsley end of the original canal to the town of Leigh.

The Leeds and Liverpool Canal, the most extensive in the kingdom, was projected by Mr. Longbotham, a native of Halifax, and executed under successive acts, the first of which was obtained in 1770. It enters this county from Yorkshire at Foulridge near Colne, where it passes through a great tunnel nearly a mile in length. From this tunnel the canal passes by or near Burnley, Blackburn, Chorley, Wigan, and Ormskirk to Liverpool. The line between Blackburn and Wigan comprehends eleven miles of the Lancaster Canal. The Douglas Navigation forms part of the line between Wigan and Ormskirk; most of the shares in that navigation having been purchased by the proprietors of the canal, who have substituted artificial cuts for the natural bed of the river. The lower part of this navigation forms a branch from the main line communicating with the Ribble. Another cut has been made from the canal at Wigan to the Duke of Bridgewater's Canal at Leigh. The length of this canal, without reckoning the branches, is more than one hundred and twenty-seven miles, including the eleven miles of the Lancaster Canal incorporated with it. From Liverpool to near the neighbourhood of Wigan, a distance of thirty miles, there is not a single lock on this canal: a fact which indicates the level character of the country which it traverses before it enters the hilly district.

The Lancaster Canal begins near Kendal in Westmoreland and runs almost due south and in a tolerably direct line to Lancaster, where it crosses the Lune by an aqueduct, the largest of the kind in England, of five arches, each of seventy feet span, and rising nearly forty above the surface of the river. Pursuing still a southward course, but on a less direct line, it passes by Garstang, at which place it crosses the Wyre by an aqueduct, to Preston. Here the canal is for a few miles replaced by a railroad, which crosses the Ribble on a viaduct bridge. The canal recommences on the south side of the Ribble valley, and runs to Wigan. That portion of the canal which extends from Shaw Hall, a few miles from Preston, to Wigan, is incorporated in the line of the Leeds and Liverpool Canal, the junction of which rendered unnecessary the further extension of the Lancaster Canal to West Houghton, as it first designed. The whole length of this canal is above 70 miles.

The Ashton-under-Lyne Canal, or, as it is sometimes called, the Manchester, Ashton-under-Lyne and Oldham Canal, commences on the eastern side of the town of Manchester, and runs in a tolerably direct line to Fairfield, about four miles from Manchester, on the road to Ashton. It has branches to Stockport, to the Huddersfield Canal at Duckinfield near Ashton, and to the collieries at Hollinwood near Oldham. This canal or its branches are carried twice over the Medlock by aqueduct bridges: near one of these, in the Hollinwood branch, there is a tunnel of considerable extent. Several cuts have been made in Manchester from this canal to several wharfs and quays in that town. It communicates with the Rochdale Canal, and by means of that with the Duke of Bridgewater's. The length of the canal and its branches (exclusive of the branch to Stockport) is between 11 and 12 miles. The acts of parliament under which it was formed were passed in the interval from 1792 to 1805 inclusive.

Of the Huddersfield Canal and the Peak Forest Canal only a very small portion is in Lancashire. They both cross the Thame near Duckinfield to unite with the Ashton-under-Lyne Canal. The acts under which they were formed were passed in or between the years 1794 and 1806.

The Rochdale Canal commences in the Calder and Hebble Navigation in Yorkshire, and proceeds by Todmorden into Lancashire. It follows the valley of the Roch to Rochdale, and from thence proceeds to Manchester, where it locks into the Duke of Bridgewater's Canal, receiving a branch from the Ashton-under-Lyne Canal by the way. It was executed under acts passed in or between the years 1794 and 1807.

The Manchester, Bolton and Bury Canal commences in the Mersey and Irwell navigation at Manchester, and runs to Bolton, with a branch to Bury. The length of the canal and branch is about fifteen miles. The acts for it were passed in 1791 and 1805.

The canals of Lancashire form part of that immense system of inland navigation which connects the Irish Sea

with the German Ocean. The Leeds and Liverpool Canal, with the Aire and Calder Navigation, forms one line of communication; and the Duke of Bridgewater's Canal, with the Rochdale Canal, the Calder and Hebble Navigation, and the Aire and Calder Navigation, forms a second. The Ashton-under-Lyne, Huddersfield, and Sir John Ramsden's Canals may be substituted for the Rochdale Canal in this last line.

The first railway formed in Lancashire was probably that which is part of the line of the Lancaster Canal at Preston already noticed. In 1826 an act was passed for making a railroad from the Manchester, Bolton, and Bury Canal at Bolton, to the branch which connects the Leeds and Liverpool Canal with the Duke of Bridgewater's Canal at Leigh. This was effected; and on the opening of the Manchester and Liverpool Railway an act was obtained for extending the line from Leigh to that railway near Newton. The length of this railway, including the extension, is about nine miles.

The Liverpool and Manchester Railroad was commenced under acts obtained in 1826 and following years, and was opened in its whole length in 1830. Its length is above thirty-one miles: it has sixty-three bridges along the line, by which it passes over or under roads or over streams; the principal is that at the valley of the Sankey, which has nine arches, each of fifty feet span and sixty to seventy feet high. The railway passes by two tunnels, the longer extending 2200 yards, and the shorter about 300, under part of the town of Liverpool. Near Liverpool, at Olive Mount, it is cut in the sandstone-rock to the depth of about 70 feet.

The Grand Junction Railway connects Birmingham (and by means of the London and Birmingham Railway, London) with the manufacturing district of the south of Lancashire. It crosses the Mersey into Lancashire near Warrington, and unites with the Liverpool and Manchester Railway near Newton.

There are railroads connected with the Liverpool and Manchester; one from Preston to Wigan, and from Wigan to Newton, twenty-four miles together; and one from Bolton and Leigh, nine miles. There are also railroads from St. Helen's to Runcorn Gap, twelve miles long; and from Manchester to Bolton, ten miles long.

An act was passed in 1826 for a railway from Manchester to Oldham, but we believe the undertaking failed. The following railroads are in course of construction:—Bolton to Preston, twenty miles long; Preston to Lancaster, twenty miles and a quarter. Preston, by Kirkham and Poulton to the new harbour forming at the mouth of the Wyre, nineteen miles and a half long; Manchester to Leeds by Middleton, Rochdale, and Todmorden, sixty miles and a half long; Manchester to Sheffield by Ashton-under-Lyne, forty miles long; and Manchester to Birmingham, seventy-two miles and a quarter long. It has been contemplated to continue the railway communication northward from Lancaster to Carlisle and Glasgow.

Of coach-roads the following are the principal:—the Port Patrick, Carlisle, and Manchester mail road enters the county at Stockport, and runs by Manchester, Chorley, Preston, Garstang, and Lancaster into Westmoreland. The Liverpool road enters the county at Warrington, and runs by Prescot to Liverpool, from which place a road runs to Preston, where it joins the high-road to Carlisle. The coach-road from Manchester to Liverpool joins the London and Liverpool road at Warrington. A road from Manchester runs by Middleton and Rochdale to Halifax and Leeds in Yorkshire; another by Oldham to Huddersfield, and so to Leeds; and another northward by Bury, Haslingden, and Clithero, into the mountain district of Yorkshire. The other roads are too numerous to be detailed. The communication by the coach-roads from London to Manchester and Liverpool has very materially diminished since the opening of the railroads along that line.

Agriculture.—The climate of Lancashire is mild and moist. The high hills which run along its eastern boundary shelter it from the cold easterly winds, but at the same time arrest the clouds which come from the Atlantic, and produce more abundant rains than in other more eastern parts of England.

The surface of the county is very uneven in the northern and eastern parts. Near the coast the land is level, and the soil consists of a good sand over a rocky subsoil, or a clay marl, which, when mixed with the upper soil, renders it extremely productive, especially in garden vegetables. There are extensive tracts of peat-moss, but few very stiff cold clays, which abound in many other parts of England, and are very expensive in the cultivation.

From the moist nature of the climate Lancashire is more productive in grass than in corn. The arable land is well cultivated wherever sufficient encouragement is given to the tenant by granting a lease for a considerable term. Many of the farms are considerable, and were formerly occupied as domains by the larger proprietors. Several still retain the name of Hall or Manor Farm, but the subdivision of property has given rise to very small occupations, which are cultivated like large gardens, and are very productive, especially the sandy loams, where excellent crops of potatoes are raised. The course of tillage has improved of late years in the larger farms; but it was far from being good when the Agricultural Survey of the county was published in 1795. The more fertile the soil the worse was the cultivation of it, crop after crop being taken without much attention being paid to manuring or cleaning the land. Oats have always been a favourite crop, partly from their suiting a moist climate, and from their forming a considerable part of the food of the inhabitants in the central and northern parts of the county. Wheat is sown where the land is favourable to it, as along the shore north of Lancaster, in the Fylde, and in the south-west part of the county.

Potatoes were early cultivated in the fields in Lancashire, and they retain their celebrity when raised in the lighter soils, and when not over-manured. The land which is broken up from grass produces the best flavoured potatoes without any additional manure; but when they are raised to feed cattle the dung is not spared, and very great crops are obtained. Early potatoes are sometimes raised, with a crop of turnips after them the same year: then follows wheat or barley, and grass seeds. If the turnips are drawn off the land the next crop must be manured, or else the soil will be much impoverished. Sometimes two crops of early potatoes are raised in one year; the second is taken up in November, and immediately cut up into sets, which are preserved in chaff or sawdust, in which they shoot early in the ensuing year. They are then planted out, and secured from frost by throwing litter over the beds when they first come up. Another method is to cut the sets, and put them on a room floor, where a strong current of air can be introduced at pleasure; they are laid very thin, and covered with sawdust or chaff, about two inches deep. There they shoot, and the air being let in when there is no frost, the shoots get strong. When they are an inch and a half long the covering is lightly removed to give access to the light. They remain growing till the time arrives for planting, when they are planted out carefully, and soon begin to throw out stems and leaves. They then bear slight frosts without much injury. The earliest potato is called the Superfine White Kidney. Several crops of this potato may be raised one after another in the same year by great attention to forwarding the sets and planting them out carefully; and where there is a demand for young potatoes the profit is very great.

Meadows and pastures are much more common in Lancashire than arable fields. Even the extent of grass which is kept for the purpose of bleaching linen on is very considerable, especially in the neighbourhood of Manchester, Bolton, and other manufacturing towns. While in other parts of England meadows and pastures are broken up and converted into arable fields, in Lancashire the reverse is the case, and many fertile arable fields have been laid down to permanent grass. There is a great inducement to do this, for the best meadow grasses and the white clover seem to find a peculiarly favourable soil in the best loams of Lancashire; and by simply marling the land white clover springs up naturally. The demand for hay has caused great attention to be paid to the making and securing of it, and extensive hay-barns which admit the air freely have been erected in many places. [BARN.]

In feeding cattle or cows for the dairy a good pasture will keep one head per acre during the summer, but there are many of which two or three acres are required to maintain a milch cow.

Sheep are not abundant in proportion to cows; and there is not that attention paid to the breed of this useful animal which it deserves; the breeds commonly met with are the black-faced and the Cheviot. The improved Leicester has gained a footing, and will not soon lose it.

The original breed of oxen in Lancashire was one of the best in England until it was surpassed by the Leicestershire,

which is only the same blood improved by careful selection. The animals of this breed have a great aptitude to fatten, and some of the cows are good milkers; but the farmers and dairymen are so careless, that if a cow or an ox has a good appearance in the market, the pedigree is never inquired into. Milk is a very important article of food in a populous district, where it can be sold as it comes from the cow; and the profit of a dairy is never so great as where new milk can be thus disposed of. Where the population is thinner, or the distance from towns is too great to carry new milk for sale, butter and cheese must be made. A great quantity of both is produced in Lancashire, and of a very good quality. The cheese is similar to the Cheshire, and, when carefully made, cannot be distinguished from it. The cheese from some particular spots, as near Leigh, Newborough, &c., is thought to be superior to the Cheshire. There is no colouring whatever put into this cheese; but inferior kinds are frequently coloured to make them pass for Cheshire. The quantity of cheese made from one cow between April and November is about 360 lbs. Mr. Boys, in the 'Agricultural Survey,' has given an account of a cow of the Lancashire breed which gave 16 lbs. of butter, each of 18 ounces, or 18 lbs. avoirdupoise in one week. She had had five calves, and was eight years old. The progeny of this cow, which was of the Lancashire long horned breed, kept up her reputation; but no trouble was taken to obtain a pure breed from her. In 1795, at the Roman Catholic College at Stonyhurst near Clithero, the cows were kept in stalls and fed with boiled food, as is the case in Flanders. Weeds, nettles, and docks were collected and boiled with more succulent vegetables. Thus, nearly half a century ago, an example was given of the Flemish mode of feeding cows, without its having been followed in a single instance; and yet it is noticed with approbation. This proves how difficult it is to alter old customs in husbandry.

Many useful horses are bred in Lancashire, for which there is a great demand in the manufacturing towns. They are chiefly cart-horses of a hardy active sort; and, with a little attention, the rearing of them is profitable to the farmer. They are worked gently when two years old, and soon earn their keep; at five years old they bring a high price, if they have a good shape, and work well. The rich pastures make them grow to a large size, and look sleek when brought to a fair. There is nothing peculiar in the breed of swine. A great deal of pork and bacon is imported from Ireland.

Divisions, Towns, &c.—The county of Lancaster is divided into six hundreds, as follows:—

	Situation	Area in Acres.	Pop. 1831.
Amounderness .	W.	145,110	69,987
Blackburn . .	E.	175,590	168,057
Leyland . .	Central	79,990	48,338
Lonsdale (including the Borough of Lancaster)	N.	266,970	56,726
Salford (including the Town of Manchester)	S.E.	214,870	612,411
West Derby (including the Boroughs of Liverpool and Wigan)	S.W.	234,730	380,078
Militia under training .			1,254
		1,117,260	1,336,854

The hundred of Lonsdale is distinguished as Lonsdale north of the Sands (including the district of Furness), 137,490 acres (population in 1831, 24,311), and Lonsdale south of the Sands, 129,480 acres (pop. in 1831, 32,415). The hundred of Blackburn is also divided: the higher division has an area of 91,710 acres (pop. in 1831, 84,072); the lower division has an area of 83,880 acres (pop. in 1831, 83,985).

The county contains the borough, market, and seaport towns of Lancaster (pop. of borough in 1831, 12,613) and Liverpool (pop. of borough in 1831, 189,242), the antient borough and market towns of Clithero (pop. of borough in 1831, 5213), Preston (pop. of borough in 1831, 33,112), and Wigan (pop. of borough in 1831, 20,774), the decayed and now disfranchised borough of Newton, the market-towns of Ashton-under-Lyne (pop. of parish in 1831, 33,597), Blackburn (pop. of the township and borough 27,091), Bolton-in-the-Moors (pop. of Great and Little Bolton and Haulgh townships, forming the parliamentary borough, 1831, 42,395), Burnley, Bury (pop. of townships of Bury and Elton in 1831, 19,140), Cartmel, Chorley (pop. in 1831, 9282), Colne, Dalton, Garstang, Hawkshead, Haslingden, Hornby, Kirkham, Leigh, Manchester (pop. of township in 1831, 142,026, or, including Salford township, 182,812), Middleton, Oldham (pop. of parliamentary borough in 1831, 50,513), Ormskirk, Poulton, Prescot, Rochdale (pop. of parliamentary borough in 1831, 20,156), Todmorden, Ulverstone, and Warrington (pop. of parliamentary borough in 1831, 18,184). Ashton-under-Lyne, Blackburn, Bolton, Bury, Manchester, Oldham, Rochdale, Salford (a suburb of Manchester) and Warrington, were made by the Reform Act parliamentary boroughs. Some of these, with one or two other places in the county, are described elsewhere [Ashton-under-Lyne; Ashton-in-Mackerfield; Atherton; Blackburn; Blackpool; Bolton; Burnley; Bury; Chorley; Clithero; Liverpool; Manchester; Oldham; Preston; Rochdale; Salford; Warrington; Wigan]. Of the others an account is subjoined.

Lancaster is in the hundred of Lonsdale, in the part south of the Sands, and on the south bank of the river Loyne, or Lune, not far from its mouth, 240 miles from London, through Leicester, Derby, Stockport, Manchester, and Preston. It is supposed, from the Roman antiquities discovered, and from the termination of the name, 'caster,' to have been a Roman station. Camden will have it to be the Longovicus of the Notitia, and others the Ad Alaunam of Richard of Cirencester. It is supposed to have been dismantled by the Picts after the departure of the Romans, but restored by the Anglo-Saxons of Northumbria, under whom it first gave name to the shire. The castle was enlarged, and the town, which had previously received a charter from King John, was favoured with additional privileges in the reign of Edward III., who conferred the duchy of Lancaster on his son John of Ghent or Gaunt, in whose favour the county was made a palatine county. The town suffered severely in the War of the Roses, and was again the scene of contest in the civil war of Charles I.

The parish of Lancaster reaches into Amounderness hundred, and comprehends an area of 66,100 acres, or above 103 square miles, with a population of 23,817. The municipal borough of Lancaster comprehends 1240 acres, and had in 1831 a population of 12,613. Considerable additions were made by the Boundary Act for the purposes of parliamentary representation. The town stands on the slope of an eminence rising from the river. The summit of the eminence is crowned by the towers of the castle, a spacious edifice, comprehending a large court-yard, some smaller yards, and several differently-shaped towers: it is now fitted up at a vast expense as a county gaol and court-house. The large square keep is very antient and prodigiously strong: the gateway, defended by two semi-octangular projecting towers, is referred to the time of Edward III. The shire hall and county-courts are modern. The streets of the town are for the most part narrow; the houses are built of freestone, which is quarried in the neighbourhood, and covered with slate. The church is on the same eminence with the castle: it is very spacious, and contains some few specimens of screen-work; the tower is of modern erection. In the churchyard is the shaft of a Danish cross with Runic characters. There are two chapels-of-ease and several dissenting places of worship. There are assembly-rooms, a theatre, and public baths. A handsome stone bridge over the Lune, at the north-eastern extremity of the town, connects it with the suburb of Skerton. There are several almshouses, and in the neighbourhood of the town is the county lunatic asylum.

The port of Lancaster formerly had a considerable share of the West India trade, which is now in a great degree transferred to Liverpool; but it still possesses a portion of the American, Russian, and a large and increasing coasting trade. The number of vessels which entered the port, which includes Preston, in 1832 was 580 (33 of them from foreign parts), having an aggregate tonnage of 38,207. The cotton manufacture has been within the last few years introduced into the town and neighbourhood.

The assizes for the northern division of the county are held at Lancaster. The council of the borough consists, under the Municipal Reform Act, of a mayor, 6 aldermen, and 18 councillors: the town was divided by the same act into three wards. The living is a vicarage, in the archdeaconry of Richmond, diocese of Chester, of the clear annual value of 1709*l.*, with a glebe-house. The perpetual curacies of

St. Anne and St. John (the two chapels-of-ease) are respectively of the clear annual value of 11[illegible]l. and 203l.

There were, in the borough, in 1833, one infant school with 100 children; a grammar school, partly supported by the corporation, with 61 children; a Lancastorian school, with 198 children; a Quakers' school, partly endowed, with 30 children; and eight other day-schools, with 216 children; two national and one other day and Sunday schools, with 603 children on a week day and 30 more on Sunday; and four Sunday schools, with 1175 children. From two boarding-schools and one Roman Catholic day and Sunday school no returns were made.

The remainder of the parish is divided into eleven townships and five chapelries. The chapelries are all in the gift of the vicar of Lancaster. There are several schools, some of them endowed, in these townships.

Cartmel is locally in the limits we have assigned to the district of Furness, but is said not to be 'within the liberties of Furness.' It is 14 miles from Lancaster across the Sands. The parish contains 22,960 acres, and had, in 1831, a population of 4802. It is subdivided into seven townships or chapelries. The town is in the townships of Lower Allithwaite and Upper Holker, in a narrow well-wooded vale watered by a small stream, and overhung on the east by the high ridge of Hampsfield Fell. The streets are narrow and irregular; the houses are chiefly built of stone. The church, which formerly belonged to a priory of the regular canons of St. Augustine, founded A.D. 1188, by William Mareschal, earl of Pembroke, was purchased at the dissolution by the inhabitants, and afterwards made parochial. It is large cross church in the early English style, with a central tower, a choir with richly ornamented stalls, and a fine east window. The nave is more modern than the rest of the building. The population of the townships in which the town stands was, in 1831, 1933. There are cotton-mills at Upper Holker, but little trade is carried on: the market is on Tuesday. There is a medicinal spring of some repute about three miles from the town. The living is a perpetual curacy, in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 113l. There were in the whole parish, in 1833, four endowed day-schools, with 115 children; three national schools, with 147 children; ten other day-schools, with 215 children; two boarding-schools, with 21 children; and seven Sunday-schools, with 337 to 347 children; beside which two of the national schools were Sunday-schools also, and had 131 children.

Near Cartmel is Holker Hall, one of the seats of the Earl of Burlington.

Colne is in the higher division of the hundred of Blackburn, 32 miles north of Manchester, and 218 from London. It is in the parish of Whalley, and near the border of Yorkshire. The chapelry of Colne contains 8050 acres, and had, in 1831, a population of 8080. The town is situated on a dry and elevated ridge near the river Calder. The chapel is an antient building repaired or rebuilt about the time of Henry VII.: on three sides of the choir are portions of an old and elegantly carved wooden screen. An antient manor house of the Lacies in this town was lately used as a workhouse. The chief manufacture of the place is that of cotton: the market is on Wednesday. The Leeds and Liverpool canal passes near the town. The neighbourhood yields slate, coal, lime, and freestone. The living is a perpetual curacy, in the archdeaconry and diocese of Chester, of the clear yearly value of 179l., with a glebe-house. There are several dissenting places of worship. The chapelry contained, in 1833, two partially endowed schools, with 82 children; and ten other day schools, with 302 children; and eight Sunday-schools, with 1540 children.

Dalton in Furness is 25 miles from Lancaster across the Sands. The whole parish contains 16,210 acres, with a population, in 1831, of 2697; but Dalton township, one of the three into which the parish is divided, contains 770 acres and 759 inhabitants. This town flourished at an early period through the neighbourhood and favour of the abbey of Furness, but on the dissolution of the abbey its consequence diminished. The town consists of a principal street terminating on the west in a spacious market-place. The church is a small neat building of considerable antiquity. There is a square tower on a rocky eminence west of the town, the remains of a castle probably built by the monks of Furness to guard the northern approach to the abbey. This building is now appropriated to the courts leet and baron of the manor and liberty of Furness. The market is on Saturday: the chief trade carried on is malting; and there are some iron-works near the town. The living is a vicarage, in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 118l., with a glebe-house. There were in the township, in 1833, two dame-schools, with 26 children; two endowed day-schools, with 189 children; ten other day-schools, with 189 children; and four Sunday-schools, with 196 children.

Garstang is in Amounderness hundred, on the north-west bank of the Wyre, and on the road from Preston to Lancaster, 229 miles from London and 11 from Lancaster. The parish contains 26,580 acres, with a population in 1831 of 6927; the township of Garstang contains 500 acres, with a pop. of 929. It is a poor town, though somewhat improved of late. The church is at what is termed Garstang Church town, about a mile from the town itself. The town-hall, a decayed building, was rebuilt about ninety years since. The market is on Thursday, and there are three yearly fairs. The Lancaster Canal crosses the Wyre by an aqueduct close to the town. There are some cotton factories and a calico printing establishment in the neighbourhood. Garstang was incorporated by charter of Charles II.; the corporation, consisting of a bailiff and seven capital burgesses, was left untouched by the Municipal Reform Act. The living is a vicarage in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 282l., with a glebe-house. There were in the township in 1833, one dame-school, with 5 children; a grammar-school with a small endowment, with 55 children; an endowed school for Roman Catholics, with 30 children on the endowment, and 35 others; and two other day-schools, with about 40 children; and four Sunday-schools with 328 children.

Hawkshead is in Furness, near the head of the small lake Easthwaite Water, on a brook flowing into the lake: it is 267 miles from London and 27 from Lancaster by Cartmel. The parish contains 22,220 acres, with a pop. in 1831 of 2060: the township of Hawkshead (one of four into which the parish is divided) contains 6700 acres, with a population of 797. There is no manufacture in the town, but the weekly market (on Monday) is considerable, the town being the centre of business for Furness Fells. There are four yearly fairs. There is a neat town-house; and near the town are the remains of an old building in which one or more monks, representatives of the abbot of Furness, performed divine service, and in which the abbot's bailiff exercised temporal jurisdiction. The church is an antient building repaired and modernized by Sandys, Archbishop of York, a native of this town, in the time of Queen Elizabeth. The living is a perpetual curacy in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 110l. with a glebe-house. There were in the township in 1833, a grammar-school, founded by Archbishop Sandys, with 20 boys; three other day-schools with 87 children, and a Sunday-school with 110 children.

There are iron-works and slate quarries in the mountains in the neighbourhood.

Haslingden is in the lower division of Blackburn hundred, 18 miles from Manchester and 204 from London. It is in Whalley parish, and constitutes a chapelry containing 4420 acres, with a population in 1831 of 7776. The older part of the town is on the declivity of a hill, on which the church, a neat substantial edifice, rebuilt in the latter part of the last century, stands. The introduction of the cotton manufacture has led to the enlargement and improvement of the town: a new square and many new buildings have been erected in the present century, chiefly at the base of the hill. The woollen manufacture, formerly the staple of the town, is still carried on to some extent; but the chief manufacture is that of cotton. The market is on Saturday; and there are several yearly fairs, chiefly for cattle and horses. The living is a perpetual curacy in the diocese and archdeaconry of Chester, of the clear yearly value of 176l., with a glebe-house. There are several dissenting places of worship. There were, in 1833, in the township, one school with a small endowment, with 48 children; nine other day-schools, with 310 children; and six Sunday-schools, with 1736 children.

Hornby is in Lonsdale hundred, south of the Sands, 9 miles north-east of Lancaster, and in the parish of Melling; the chapelry of Hornby contains 2290 acres, with a population in 1831 of 383: the population had decreased in the

preceding ten years owing to families removing to the manufacturing districts. The town is on the banks of the river Wenning, near its junction with the Lune. Hornby Castle, near the town, the antient seat of the Stanleys, Barons Monteagle, is now fitted up as a modern mansion. In the neighbourhood are some remains of a fort ascribed to the Saxons, and of an antient religious house. The chapel is a neat building with an octagonal tower. The market, held every alternate Tuesday, is well attended: it is chiefly for cattle: there is a yearly fair. The living is a perpetual curacy in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 92*l.* There were in the chapelry in 1833, two day-schools, with 44 children, and one Sunday-school, with 40 children.

Kirkham is in the hundred of Amounderness, 40 miles from Manchester and 226 from London. It is about 8 miles west of Preston, and about 3 from the north bank of the æstuary of the Ribble. The parish contains 41,850 acres, with a population in 1831 of 11,630: it is divided into seventeen townships or chapelries; the township of Kirkham contains 850 acres, with a population of 2469: the population of the township had materially decreased between 1821 and 1831. The town is small, but the houses are tolerably good. The church was rebuilt in 1822, but the antient tower of Norman architecture remains. There are two or three Dissenting or Catholic places of worship. The chief manufacture of the town is cotton; but some sail-cloth, sacking, and cordage, formerly the staple of the place, are made. The market is on Tuesday, and there are two yearly fairs. The living is a vicarage in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 921*l.*, with a glebe-house. There were in the township in 1833, six dame schools, with 104 children; five endowed schools (one of them a well endowed grammar-school, two of them Catholic), with 215 scholars; and five other day schools, with 155 children; and five Sunday-schools (one endowed), with 443 children.

Leigh is in the hundred of West Derby, 197½ miles from London, on the road from Newton to Bolton. The parish comprehends an area of 11,820 acres, with a population in 1831 of 20,083. It is subdivided into the six townships of Astley or Astleigh (East Leigh) (population 1832); Atherton (pop. 4181); Bedford (pop. 3087); Pannington (pop. 3165); Tyldesley with Shakerly (pop. 5038); and West Leigh (pop. 2780). The townspeople are engaged in the manufacture of cambrics and fustians. There are collieries and stone quarries in the parish. The district round the town is occupied by dairy farms, and is famous for cheese. Leigh communicates with Manchester by the Duke of Bridgewater's Canal, and with the Leeds and Liverpool Canal by a branch canal to Wigan. A railway from Bolton by this town communicates with the Liverpool and Manchester Railway. The living is a vicarage in the archdeaconry and diocese of Chester, of the clear yearly value of 263*l.*, with a glebe-house. Atherton and Astley townships constitute distinct chapelries. There were in the six townships in 1833, six infant or dame schools, with 162 children; two partially endowed day-schools, with 90 scholars; twenty-six other day-schools, with 923 scholars; and eighteen Sunday-schools, with 3940 scholars.

Middleton is in Salford hundred, 6½ miles north by east of Manchester, and 192½ from London, near the river Irk which flows into the Irwell. The parish contains 11,510 acres, with a population in 1831 of 14,379: it is divided into eight townships or chapelries; Middleton township contains 1860 acres, with a population of 6903. This town owes its prosperity to the cotton manufacture, which is carried on in its different branches. A charter for a market was granted in 1791: it is held on Friday. A market-house with shambles, also warehouses for general merchandise, were erected by Lord Suffield, lord of the manor. Coals are dug in the parish. The church is an antient building, with a carved screen dividing the chancel from the choir. There are several dissenting places of worship. The living is a rectory in the diocese and archdeaconry of Chester, of the clear yearly value of 1070*l.*, with a glebe-house. There were in 1833 in the township, a grammar-school, founded and endowed by Dr. Alexander Nowell, dean of St. Paul's, London, with about 100 children; a school with 33 children, partly supported by Lord Suffield; and thirteen other day-schools, with 391 children; and one boarding-school, with from 40 to 60 children; also ten Sunday-schools, with 2644 children.

Newton is in West Derby hundred, locally between Manchester and Liverpool, but not on the road between those towns, 193 miles from London, through Warrington. Newton is a chapelry in Winwick parish, and contains 3070 acres, with a population in 1831 of 2139. The place consists chiefly of one street; it has an antient court-house, now used for a school. There is a market-cross, though the market has been long discontinued. Newton was a borough by prescription, and returned two members to parliament from 1 Elizabeth, till it was disfranchised by the Reform Act. The chapel is a comparatively modern building. The living is a perpetual curacy, of the clear yearly value of 114*l.*, in the archdeaconry and diocese of Chester. There were in 1833 one endowed school, with 84 children; three other day-shools, with 219 children; and two Sunday-schools, with 277 children.

Ormskirk is in West Derby hundred, 13 miles north by east of Liverpool and 219 from London. The parish contains 31,150 acres, with a population in 1831 of 14,053, and is divided into seven townships or chapelries: the township of Ormskirk contains 600 acres, with a population of 4251. The town consists of four principal streets, which intersect each other at right angles. The church is mostly modern, with a few portions of late perpendicular character: it has a large western tower at the end of the nave, and another tower and spire at the west end of the south aisle. This church contains the burial-place of the earls of Derby. Cotton and linen thread, silks, hats, and rope, are manufactured here, but not extensively. There are a weekly market and two yearly fairs. Coals are dug in the parish; and a quantity of carrots and early potatoes are grown for the supply of Liverpool. The living is a vicarage in the archdeaconry and diocese of Chester, of the clear yearly value of 387*l.*, with a glebe-house. There were in 1833, an infant school, with 136 children; an endowed grammar-school, with 22 children; and one endowed day and Sunday school, with 106 children daily, and 144 children in addition on Sundays.

In the parish, about three miles east of the town, is Lathom House, the seat of Lord Skelmersdale, which in the civil war of Charles I. was gallantly defended for the king by Charlotte de la Tremouille, countess of Derby. The house was well calculated for defence, standing in a boggy flat, and being defended by a wall six feet thick, strengthened by nine towers, on each of which were mounted six pieces of ordnance, and surrounded by a moat twenty-four feet broad. The siege was raised, but the place was ultimately surrendered by the king's order.

Lathom township contained a population of 3272 in 1831. There are in the township an endowed school, a chapel, an almshouse, and a chalybeate spring.

Poulton is in Amounderness hundred, 16½ miles north-west of Preston and 234 from London. The parish contains 15,400 acres, and had in 1831 a population of 4082; it is divided into five townships; that of Poulton contains 1150 acres, with a population of 1025. The town is about a mile from the æstuary of the Wyre. The church was rebuilt in the last century, except the tower, which is of the time of Charles I. There are three or four dissenting places of worship. The living is a vicarage in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 257*l.*, with a glebe-house. The town has neither trade nor manufactures. There were in the township in 1833 six day-schools with 108 children, and two Sunday-schools with 300 children. The endowed grammar-school of Hardhorn township in this parish is free to the children of Poulton township; in 1833 it had 140 children.

Prescot is in West Derby hundred, [illegible] from London, and 8 from Liverpool. The parish, [illegible] fifteen townships or chapelries, contains 34,920 [illegible] a population in 1831 of 28,084. The township of Prescot contains 240 acres; pop. 5055. There are extensive collieries in the parish. Among the principal manufactures of the town are those of small files, and the movements and other parts of watches, also coarse earthenware, especially sugar-moulds, sail-cloth, and cottons. The market is on Tuesday. The Liverpool and Manchester railway passes near the town, and the coach-road between those towns passes through it; the town consists principally of one long street along this road. The church is antient and large; the tower and spire are of modern erection. There are several dissenting meeting-houses. The living is a vicarage in the archdeaconry and diocese of Chester, of the clear yearly value of 893*l.*, with a glebe-

house. There were in the township in 1833 one endowed school, with 55 scholars, ten other day-schools with 403 scholars; and three Sunday schools with 960 children.

Saint Helen's is in the township of Windle, in the chapelry of St. Helen's, Prescot parish. The township contains 3550 acres, and had, in 1831, a population of 5825. The town has risen into importance of late years, chiefly by means of the large establishment of the British Plate glass Company at Ravenhead, in the adjacent township of Sutton, and of the copper-works belonging to the proprietors of the Parys Mine in Anglesey, who brought their ore here to be smelted. The market, which is customary, is held on Saturday; and there are two yearly fairs. There is an episcopal chapel and some Dissenting and Catholic places of worship. The living is a perpetual curacy of the clear yearly value of 210*l*, with a glebe house. There were in the township in 1833, four day schools, supported wholly or in part by endowment or gift, with 212 children, fifteen other day-schools, with 441 children, and five Sunday schools, with 1305 children.

The Liverpool and Manchester Railway and the Sankey Canal pass near the town, and there is a railway from St Helen's to Runcorn Gap on the Mersey.

Todmorden is in Salford hundred, 21½ miles from Manchester and 207½ from London. The town is partly in the townships of Todmorden and Walsden, in Rochdale parish, containing together 1011 acres, with a population in 1831 of 6054, and partly in the townships of Langfield and Stansfield, in Halifax parish, in the West Riding of Yorkshire, which have an area of 8540 acres, with a population in 1831 of 10,776, together 9551 acres, population 16,830. The inhabitants are engaged in the cotton and woollen manufactures, both of which have greatly increased. There are two episcopal chapels, both of modern date, but one was rebuilt on the site of a more ancient chapel; there are also several dissenting meeting houses. The market is on Thursday. Every month there is a great cattle market; there are two yearly fairs. The Rochdale Canal and the Manchester and Leeds Railway pass near the town. The living is a perpetual curacy in the archdeaconry and in the diocese of Chester, of the clear yearly value of 134*l*, with a glebe house. There were in 1833, in the four townships, four infant or dame schools with 105 children, sixteen day schools with 531 children, one day and Sunday school with 30 children on week days, and 130 on Sundays, and eighteen other Sunday schools with 3616 scholars.

Ulverstone is in Furness, 261 miles from London, or 21 from Lancaster, across the Sands. The parish contains 29,100 acres, with a population in 1831 of 7741. There are slate quarries in several parts of the parish, in which about 100 adult labourers are employed. The township of Ulverstone contains 2900 acres, with a population of 1876. The town is pleasantly situated on a declivity sloping to the south, about a mile from the sands, in the æstuary of the Leven. It rose to prosperity on the dissolution of Furness Abbey. The town consists of four principal streets, spacious and clean, the houses are chiefly built of stone. There are a theatre, assembly room, and subscription library. The church, a plain neat structure, has been almost entirely rebuilt in the present century; the tower and a Norman doorway remain of the old church. There are several dissenting meeting houses. The market is held on Thursday, for grain and provisions, and is well supplied; there are two large yearly cattle fairs. There are some manufactures of cottons and coarse linens. A canal from the æstuary of the Leven enables large vessels to come up and discharge their cargoes in a spacious basin, almost close to the town, from which there is a considerable export of iron ore, iron, slates, and other articles. Some ship building is carried on. The living is a perpetual curacy in the archdeaconry of Richmond, diocese of Chester, of the clear yearly value of 149*l*. There were in the township in 1833 two national schools, with 289 scholars, and eleven other day school (one with a small endowment), with 316 children, one Catholic day and Sunday school, with from 50 to 100 children, and four Sunday schools with 101 children.

Besides the towns above described there are many places in this county which have acquired such importance from their population as to demand a brief notice. Newchurch, in Rossendale (pop. 9136), has considerable woollen and cotton manufactories, and quarries of freestone, coal, and slate. It constitutes a chapelry of the clear yearly value of 231*l*. It has a large chapel capable of containing 1300 persons, and two or three dissenting meeting-houses. There is an endowed school with 35 scholars, and several national and other day and Sunday schools. Padiham (pop. 3529) has also considerable cotton manufactories, an episcopal chapel, two dissenting meeting houses, one endowed day and Sunday school, and several other schools. The clear value of the curacy is 131*l* a year, with a glebe-house. At Old and New Accrington (joint pop. 6283), Higher and Lower Booths (joint pop. 6525), Habergham Eaves (pop. 5817), and Oswaldtwistle (pop. 5897), the cotton manufacture is carried on. Accrington is a separate chapelry, of the clear yearly value of 158*l*, with a glebe house.

The above mentioned places are all in the hundred of Blackburn, and in the parish of Whalley, one of the most extensive parishes in England. It is chiefly in Blackburn hundred, but extends into the West Riding of Yorkshire, and has a detached portion in the county of Chester. It comprehends an area of 108,140 acres, with a population of 97,868. There are in it fifteen or sixteen chapelries with parochial rights. Before the dissolution this parish was under the jurisdiction of the ancient abbey of Whalley. This abbey was built in 1296 for the White or Cistertian Monks of Stanlaw in the Wirral in Cheshire, by Henry Lacy, or Lacı, earl of Lincoln. The abbey flourished till the dissolution, when its yearly revenue was 551*l* 4*s* 6*d* gross or 321*l* 9*s* 1*d* clear. Encouraged by Aske's rebellion, the monks resumed possession of the abbey, for which act the abbot and one of his monks were executed for treason. Of this abbey there are considerable remains, including two stately gateways, a building conjectured to have been the abbot's private oratory or chapel, and other parts less perfect. Some portions of the ruins are very good specimens of decorated and perpendicular English architecture. The parish church of Whalley is large and mostly of early English character, of which style the chancel is a fine specimen. The east window and the windows of the nave are later insertions in the perpendicular style. There are in the chancel three plain stalls and some good wood screen-work, supposed to have been brought from the abbey. The living of Whalley is a vicarage, in the archdeaconry and diocese of Chester, of the clear yearly value of 157*l*, with a glebe house; the vicar has the right of presentation to several of the chapelries in the parish.

Leyland township (pop. 3404) in the parish and hundred of Leyland (17,050 acres, 13,951 inhabitants), has also some cotton manufactories. It had in 1833 an endowed grammar school with 20 children, and another endowed school with nearly 60 children. The chapelries of Heap (pop. 10,121) and Tottington (pop. 9280) and the township of Walmersley (pop. 3156) are all in the parish of Bury, and in the neighbourhood of the town of Bury, but not included in the parliamentary borough. The inhabitants are engaged in the cotton manufacture. Horwich (pop. 3562) and West Houghton (pop. 4500) are in the parish of Dean, between Bolton and Wigan. The townships of Barton (pop. 8670), Pendleton (pop. 8435), and Worsley (pop. 7833) are in Eccles parish, west of Manchester. At Worsley are the extensive collieries formerly belonging to the duke of Bridgewater. The township of Pilkington (pop. 11,006) is in Oldham parish, but is not included in the parliamentary borough. Radcliffe (pop. 3901) is a parish near Bury, and the townships or chapelries of Blatchingworth and Calderbrook (pop. 4221), Butterworth (pop. 5648), and Wuerdle and Wardle (pop. 6754) are near the town and in the parish of Rochdale, though not included in the parliamentary borough. These places are all, with the exception of Leyland, in the hundred of Salford, which is the principal seat of the cotton manufacture.

In West Derby hundred are the following places:— North Meols (pop. 5132) is a parish on the coast at the entrance of the æstuary of the Ribble. Everton (pop. 4518) is a township in the parish of Walton on the Hill, near the æstuary of the Mersey; it forms a suburb of Liverpool and is the residence of many genteel families. West Derby (pop. 9613), is in the same parish, more remote from Liverpool. Eccleston (pop. 3259), and Sutton (pop. 3173), are townships in Prescot parish, and participate in the manufactures of that town—flint and crown glass, earthenware, and watch movements. The neighbourhood yields stone and coal. Hindley (pop. 4715), Pemberton (pop. 4276), and Upholland (pop. 3010), are all in Wigan parish.

Divisions for Ecclesiastical and Legal Purposes.—Upon the conversion of the Northumbrian Saxons to Christianity,

this county was comprehended in the diocese and province of York. After the establishment of the West Saxon supremacy, the southern part of the county was added to the diocese of Lichfield and the province of Canterbury. In the year 1541 the disunited portions of the county were re-united in the new diocese of Chester, formed by Henry VIII., and have continued united up to the present time. The county is divided between the two archdeaconries of Chester in the south and Richmond in the north. The archdeaconry of Chester comprehends the four rural deaneries of Blackburn, Leyland, Manchester, and Warrington; that of Richmond contains the deaneries of Amounderness and of Furness and Cartmel. By an order in council just promulgated, pursuant to the act 6 and 7 William IV., c. 77, the whole of the county (except the deanery of Furness and Cartmel, which is to be added to the diocese of Carlisle) is to form the new diocese of Manchester, in the province of York. The collegiate church of Manchester is to become the cathedral, and the warden and fellows are to be the dean and canons. The revenue of the new see is to consist of an endowment averaging 4500*l.* per annum. The parishes are comparatively few: there are only sixty-eight, including Burton in Kendal, which is chiefly in Westmoreland, and Mitton and Oldham, which extend into Yorkshire. Twenty-six of these parishes are rectories, twenty-nine vicarages, the rest perpetual curacies. The rectory of Winwick, one of the richest in the kingdom (clear annual value 3016*l.*), is in this county.

The parishes are very extensive. Whalley parish (108,140 acres) and Lancaster (66,100 acres) have been already noticed. Oldham parish (58,620 acres), Blackburn (45,620 acres), Kirkham (41,850 acres), Prescot (34,920 acres), Manchester (31,260 acres), Bolton (31,390 acres), and Ormskirk (31,150 acres), are next in extent. Of the remaining fifty-nine parishes twelve consist of above 20,000 acres, and eighteen of above 10,000. There are however numerous dependent district chapelries, and many chapels-of-ease and new churches have been built.

The Dissenters form a considerable body in the large manufacturing towns, and the Wesleyan Methodists are particularly numerous. There is also a very considerable body of Roman Catholics.

Lancashire is in the northern circuit. The assizes were till of late years held at Lancaster alone: but they are now held at Lancaster for the northern division of the county, comprehending the hundreds of Lonsdale, Amounderness, Blackburn, and Leyland; and at Liverpool for the southern division, consisting of the two hundreds of Salford and West Derby. The quarter-sessions are held at Lancaster, and by successive adjournments at Preston, Salford, and Liverpool.

By the Reform Act the county was divided into two parts for parliamentary purposes. The division coincides with that for judicial purposes. The election for the northern division takes place at Lancaster: the polling-places are Lancaster, Hawkshead, Ulverstone, Poulton, Preston, and Bromley. The election for the southern division takes place at Newton: the polling-places are Newton, Wigan, Manchester, Liverpool, Ormskirk, and Rochdale.

Fourteen members were formerly returned to parliament for this county; viz., two for the county itself and two each for the boroughs of Lancaster, Clithero, Liverpool, Newton, Preston, and Wigan. By the Reform Act Newton was disfranchised and Clithero reduced to one member: but the division of the county, with the creation of four new boroughs, Manchester, Bolton, Blackburn, and Oldham, each returning two members, and of five, Ashton-under-Lyne, Bury, Rochdale, Salford, and Warrington, each returning one member, has raised the whole number to twenty-six.

Lancaster, as a county palatine, possesses a chancery court. At an early period the county was distinguished as *an honour*, or superior feudal lordship. In the time of Henry III. the honour was erected into an earldom, in favour of Edmund, surnamed Crouchback, second son of that king. In the time of Edward III. the earldom was erected into a duchy in favour of Henry Plantagenet, the then earl, and afterwards of John of Gaunt, who had married the heiress of Henry, and for whom the county was made a palatine county. Henry IV., son of John of Gaunt, procured an act of parliament that the title and revenues should remain to him and his heirs for ever as a distinct and separate inheritance from the crown; but in the time of Edward IV. the duchy was declared forfeited to the crown, to which, by act of parliament, both it and the county palatine were inseparably united. The chancery court has a chancellor, attorney-general, and other functionaries, and has an equity jurisdiction within the limits of the duchy.

History and Antiquities.—In the earliest period of English history this county was inhabited chiefly by the Brigantes (Βριγαντες, Ptolemy), the most numerous and powerful of the tribes which then possessed the island. As Ptolemy has given the name of Σεταντιων Λιμην, Haven of the Setantii, to an æstuary (the Ribble, according to some, the Lune, according to others) in this county, it is likely that a tribe called Σετάντιοι, Setantii, occupied the northern part. The Brigantes were subdued by Agricola, and in the subsequent division of Britain Lancashire was included in the province of Maxima Cæsariensis, which comprehended all the country from the Mersey, the Don, and the Humber, to the Roman wall.

Several places mentioned by antient geographers are commonly identified with positions in this county. The Μορικαμβη εἴσχυσις, 'the mouth (or æstuary) of Morecambe,' has retained its name with scarcely any change; the Σεταντιων Λιμην has been noticed, the Βελισαμα εἴσχυσις, which Horsley supposed to be the mouth of the Mersey, is by later geographers transferred to the Ribble; and the Σετηια εἴσχυσις, which Horsley considered to be the mouth of the Dee, has been transferred to the bay which receives both that river and the Mersey. Ῥιγόδουνον, one of the towns of the Brigantes mentioned by Ptolemy, is supposed to be the Coccium of Antoninus, now Ribchester.

Of the stations of the Antonine Itinerary, Mancunium is identified with Manchester, and Coccium with Ribchester on the north bank of the Ribble, midway between Preston and Clithero (though some, with less reason, fix it at Blackrode, between Manchester and Preston, others at Corkey or Cockley, near Bury, and others again at Bury itself); Bremetonacæ or Bremetonacis is fixed by some at Lancaster, and by Camden and others, with more reason, at Overborough near Tunstal, some miles higher up the Lune, in the neighbourhood of Kirkby Lonsdale.

In Richard of Cirencester's map Morecambe is marked as a river, and the Alauna, Belisama, and Seteia are evidently identified by him with the Lune, the Ribble, and the Mersey. His Portus Sistuntiorum (probably the Σεταντιων Λιμην of Ptolemy) is so given in his map and his Itinerary, as best to accord with the mouth of the Lune: the Sistuntii however extend along the coast at least as far south as the Belisama, or Ribble; and another tribe, the Voluntii, whom he describes as confederated with them, occupy the more inland tract immediately to the west of the great Pennine chain, as far south as the Seteia, or Mersey. Mancunium is not given in his map, though it is mentioned in his Itinerary. Coccium, in his map, is evidently fixed at or near Ribchester, and Rerigonium agrees in position with Lancaster: possibly Ad Alaunum, which he mentions in his Itinerary, is another name for the same place. The termination 'caster' leads us to fix a station at this town; and the first syllable 'Lan,' or, as it is provincially pronounced, 'Lon,' accords well with the name 'Ad Alaunum,' as well as with the first syllable of Longovicus, a station mentioned in the Notitia, which Camden is decided in placing here. If the Rerigonium and Ad Alaunam of Richard be fixed here, there is an additional reason for fixing on Overborough as the site of Bremetonacæ, for we cannot suppose that Lancaster had three antient designations entirely distinct from each other.

Several Roman roads have been traced in this county, and the direction of these may enable us to determine between the positions assigned to the above stations. Six of them diverge from Manchester (Mancunium) as a common centre. One runs north-west to Blackrode, and another north to Ribchester, the position most reasonably assigned to Coccium; two others run into Cheshire, one south-east by Stockport, another south-west by Stretford, supposed to be the Fines Flaviæ et Maximæ mentioned by Richard. Two others run into Yorkshire, one north-east toward Halifax, one, which branches from the foregoing, more easterly toward Oldham, Saddleworth, and Almondbury. The road to Ribchester is continued northward in the direction of Overborough, the Bremetonacæ of Camden. One branch road led from Ribchester to Freckleton on the north side of the æstuary of the Ribble, and another from Overborough to Lancaster, the Ad Alaunam and Rerigonium of Richard. It has been supposed that a Roman road entered

the county at Warrington, and ran northward by Blackrode and Preston to Lancaster. A vicinal way led from the neighbourhood of Manchester to Warrington.

All traces of the station Mancunium have disappeared; of Coccium and Bremetonacæ some traces are visible at Ribchester and Overborough. Various antiquities have been dug up or found at each of these places: at Manchester, some inscriptions on stones; at Ribchester, various inscribed and other stones, coins and other smaller antiquities; and (in 1796) a helmet and several plates or vessels of copper or earthenware; and at or near Overborough an altar, a tesselated pavement, and other antiquities. Coins and other antiquities have been found at Colne (perhaps the Colunio of Ravennas), and at Cliviger near Burnley.

Long after the invasion of the Saxons Lancashire, the northern part at least, retained its independence as a part of the British State of Cumbria, or Cumberland, though this was frequently obliged to own the supremacy of the Northumbrian Angles. Egfrid, the son of Oswio, who reigned over the Northumbrians A.D. 670—685, conquered a part of the county and bestowed Cartmel in Furness with the Britons therein (et omnes Britanni cum ea) on St. Cuthbert, bishop of Lindisfarne, or rather annexed it to the temporalities of that see. Whether Lancashire or any part of it was permanently brought into subjection by the Saxons before the submission of the Cumbrian Britons to Edward the Elder, A.D. 921, is not known. Sir Francis Palgrave, in his map of England as divided into the great earldoms of Edward the Confessor's reign, divides Lancashire between the earldom of Coventry, then held by Leofric, and the subordinate principality of Cumberland, held by a Scottish prince. The Ribble is assigned as the boundary between the two; and the line of division is nearly or quite coincident with that which separates the present archdeaconries of Chester and Richmond.

In A.D. 1323 the northern part of the county was ravaged by the Scots under Robert Bruce, who advanced as far as Preston, part of which he burned. In the civil war of the Roses no event of importance occurred in Lancashire, but in the reign of Henry VII., the Earl of Lincoln and Lord Lovel, with 2000 German soldiers under Martin Swart, and a number of Irish under Lord Geraldine, landed in Furness, to support the cause of the impostor Lambert Simnel. In the reign of Henry VIII., when the rebellion known as 'The Pilgrimage of Grace' took place, the populace of Lancashire rose, but were put down by the earls of Shrewsbury and Derby. In the civil war of Charles I. many contests took place. Lord Strange, afterwards earl of Derby, headed the royalists. He made an unsuccessful attempt in 1642 on Manchester, which was occupied for the parliament by the county militia. Preston and Lancaster were subsequently taken by the parliamentarians and retaken by the royalists. In 1644 the siege of Lathom House, already noticed, took place; it was raised on the approach of Prince Rupert, who had previously taken Bolton, and afterwards obliged Liverpool to surrender; but in the following year the house was besieged again, and was given up by order of the king. In the attempt of the royalists to renew the war in 1648 the Duke of Hamilton and General Langdale marched southward to Preston, in the neighbourhood of which, on Ribbleton Moor, they were routed by the less numerous but veteran forces of Cromwell and Lambert. The vanquished fled southward, were overtaken and again defeated at Winwick and Warrington. Lancaster Castle was meantime besieged by the royalists, but in vain. In the year 1651 the Earl of Derby again raised the royal standard, but being defeated by Lilburne at Wigan Lane, and subsequently taken, was executed at Bolton.

In the Rebellion of 1715 the supporters of the Pretender were compelled to surrender at Preston, to which place they had advanced in their march southward, to the royal army under Generals Wills and Carpenter. In the Rebellion of 1745 the army of the young Pretender crossed the county twice; once in its advance into England, and again in its retreat.

Of the early periods of our history there are but few castellated remains. The keep of Lancaster and Dalton castles, the ruins of the castle on the island of Pile of Fouldrey, and Hornby Castle, have been already noticed. Gleaston Castle is in Furness, about two miles east of Furness Abbey: the ruins consist of portions of three square towers, with some connecting walls, formed of mud and pebbles, and faced with limestone, enclosing an area or court-yard. Thurland Castle near Hornby is an old mansion which, having been fortified, stood a siege in the civil wars of Charles I. The ruins of Greenhaugh Castle, a mile from Garstang, consist of one shattered tower. The monastic ruins are of greater interest. Cockersand Abbey is about six miles south-west of Lancaster, on a point of land at the mouth of the Lune. The buildings are said formerly to have covered an acre of ground, but the only remain is the chapter-house, an octangular room the roof of which is supported by a single pillar rising in the centre. Furness Abbey is near Dalton in Furness, on the banks of a rivulet in a narrow and fertile vale. It was founded A.D. 1127 by Stephen, then earl of Morton (Mortain) and Bulloin (Boulogne), afterwards king of England, for Cistertian monks removed here from Tuiket in Amounderness, but originally from Savigny in France. Its yearly revenue at the dissolution was 966*l.* 7*s.* 10*d.* gross, or 805*l.* 16*s.* 5*d.* clear. The ruins of this abbey are still magnificent, and from the seclusion and picturesque beauty of the surrounding scenery are among the most striking of our monastic remains. They are of Norman and early English character. The whole length of the church is said to be 287 feet; the nave is 70 feet broad, and the walls are in some places 54 feet high and 5 feet thick. The windows and arches are upon a scale of unusual loftiness. There are ruins of the chapter-house and cloisters, and of the school-house, a large building detached from all the rest. The immediate precincts of the abbey, said to comprehend 65 acres, are enclosed by a stone-wall, on which appear the remains of small buildings, the offices of the abbey, and entered by a gateway, a beautiful pointed arch. The ruins are built of a pale red stone, dug in the neighbourhood, and changed by time and weather to a dusky-brown tint. They are everywhere embossed by climbing or parasitic plants. Whalley Abbey and the Priory Church of Cartmel have been already noticed.

(*Beauties of England and Wales;* Arrowsmith's *Map of England;* Walker's *Map of Lancashire;* Rickman's *Gothic Architecture;* *Parliamentary Papers;* Conybeare and Phillips's *Geology of England and Wales;* Priestley's *Hist. Acct of Navigable Rivers and Canals;* Horsley's *Britannia Romana;* Reynold's *Iter Britanniarum;* Palgrave's *Rise and Progress of the English Commonwealth,* &c.)

STATISTICS.

Population.—Lancashire is mostly a manufacturing county, ranking the 41st on the list of agricultural counties, and in this respect it retains the same position as it did in 1811 and 1821, when it was also the 41st on the list. Of 313,097 males, twenty years of age and upwards, inhabitants of this county when the census was taken in 1831, there were 97,517 employed in manufactures and in making manufacturing machinery; 60,516 employed as labourers in labour not agricultural; and only 37,321 engaged in agricultural pursuits, of whom 20,949 were labourers.

Of those employed in manufactures by far the greater proportion consists of boys and females, notwithstanding the large number of men so engaged. In the hundred of Amounderness, of males twenty years of age and upwards, 3000 are employed at Preston, 230 at Kirkham, and about 1000 collectively at Goosnargh, Wood-Plumpton, and forty other places, in the manufacture of cotton goods of almost endless variety. In the hundred of Blackburn 8700 men are employed in the very extensive parish of Whalley, 3350 in the township of Blackburn, and 3500 in the other townships of that large parish: the township of Ribchester (in the parish of Ribchester) contains 250: besides these nearly 2000 are similarly employed in several other places in Blackburn hundred. In the hundred of Leyland, Chorley contains 1200 males employed in the cotton manufacture, the township of Leyland 400, and the residue of that parish in various townships collectively 2300; in other places 450. In the hundred of Lonsdale, north of the sands, about 100 males at Coulton and 40 at other places; in Lonsdale, south of the sands, about 140, chiefly at Catton, Scotforth, and Halton. In the hundred of Salford the town of Manchester contains about 12,000 men employed in the cotton and silk manufactures; Salford 3500, including many makers of machinery; Oldham 4000; and Crampton, in that parish, 4200; Great Bolton and Little Bolton 6100; Bury 1600; and Tottington 1500; Spotland and Castleton (in Rochdale parish) 2000; Middleton township 1100; Chorlton Row, near Manchester, 1900; Heaton-Norris 1100; and other townships in the great parish of

Manchester about 4000 collectively: Pendleton 850; and besides all these there are 18,000 in the numerous manufacturing townships of this populous hundred. In the hundred of West Derby the town of Wigan contains 2600 men engaged in manufactures; the parish of Leigh 2800; and other places about 3000. The makers and repairers of spinning-jennies, looms, and other machinery employed in the cotton, silk, and woollen manufactures, are very numerous, but are mostly connected with the cotton factories in such manner as to preclude any distinct mention.

The manufacture of woollen articles in this county is comparatively unimportant: the number of men employed in worsted-mills and as fullers, makers of baize, blankets, and flannels, being about 2700, chiefly at Newchurch in Whalley parish, in Rochdale and at Bury.

At Chorlton-Row, near Manchester, 1900 men are employed as workers in iron and brass; at Ashton 240, at Prescot 24, in the parish of Ulverstone 14. The manufacture of hats employs 550 men in several of the townships in the parish of Manchester, and 300 at Oldham. In the parish of Prescot 200 men are employed in making glass bottles and in glass-grinding, and 20 at West Derby. There are manufactures of pins and of sailcloth at Warrington; 70 men are employed in making sailcloth at Freckleton; and at Liverpool 340 men are engaged in various manufactures usual in a large seaport town.

The following Table is a Summary of the Population, &c., of every Hundred, &c., as taken in 1831.

HUNDREDS, TOWNS, AND BOROUGHS.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
Amounderness . .	12,847	13,508	99	733	3,309	8,191	2,008	34,091	35,896	69,987	16,183
Blackburn . .	29,509	31,249	97	1,874	3,132	23,469	4,648	82,966	85,091	168,057	37,266
Leyland . . .	8,138	8,551	13	518	1,875	5,251	1,425	24,127	24,211	48,338	11,013
Lonsdale (North of the Sands) . .	4,603	4,753	20	295	1,856	1,510	1,387	12,126	12,185	24,311	5,806
Lonsdale (South of the Sands) . .	3,544	3,692	20	196	1,802	1,001	889	9,975	9,827	19,802	4,091
Salford . . .	75,565	83,901	608	3,468	5,685	64,082	14,134	211,337	218,265	429,602	100,023
West Derby . .	28,882	31,200	505	1,385	6,657	16,280	8,263	83,855	86,207	170,062	39,850
Lancaster (Borough).	1,975	2,173	7	63	62	1,055	1,056	5,471	7,142	12,613	2,707
Liverpool (Borough) .	29,546	38,122	1,409	1,207	227	18,881	19,014	87,919	101,323	189,242	44,726
Manchester (Town) .	29,651	38,888	80	1,239	75	30,809	8,004	87,320	95,492	182,812	45,847
Wigan (Borough) .	3,870	3,988	4	288	16	3,164	808	9,948	10,826	20,774	4,775
Militia under training	..	..	..	..	..	..	..	1,254	..	1,254	..
Totals .	228,130	260,025	2,842	11,266	24,696	173,693	61,636	650,389	686,465	1,336,854	313,097

The population of Lancashire at each of the following periods was as under—

	Males.	Females.	Total.	Increase per cent.
1801	322,356	350,375	672,731	..
1811	394,104	434,205	828,309	23·13
1821	512,476	540,383	1,052,859	27·10
1831	650,389	686,465	1,336,854	26·97

showing an increase between the first and last periods of 664,123, or rather more than 98½ per cent., which is 41½ per cent. above the whole rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

		£.		s.	d.	
1801	were	148,282,	being	4	4	for each inhabitant.
1811	..	306,797	„	7	4	„
1821	..	249,585	„	4	8	„
1831	..	293,226	„	4	4	„

The expenditure for the same purpose in the year ending March, 1837, was 183,790*l.*: assuming the population to have increased since 1831 in the same proportion as in the ten preceding years, the above sum gives an average of about 2*s.* 4½*d.* for each inhabitant. All these averages are below those for the whole of England and Wales.

The sums raised in Lancashire for poor-rate, county-rate, and other local purposes, in the year ending 25th March, 1833, was 430,429*l.* 11*s.*, and was levied upon the various descriptions of property as follows:—

	£	s.
On land . .	£167,681	19*s.*
Dwelling-houses . .	162,691	17
Mills, factories, &c. .	75,547	11
Manorial profits, navigation, &c.	24,508	4
	430,429	11

The amount expended was—

	£	s.
For the relief of the poor . .	£274,981	11
In suits of law, removal of paupers, &c.	17,215	13
For other purposes . .	149,578	5
	441,775	9

In the returns made up for the subsequent years the descriptions of property assessed are not specified. In the years ending March, 1834, 1835, 1836, and 1837, there were raised 428,770*l.*, 378,946*l.* 14*s.*, 331,7[illegible]0*l.* 7*s.*, and 251,[illegible]*l.* respectively; and the expenditure for each year was as follows:—

	1834 £	s.	1835 £	s.	1836 £	s.	1837 £	s.
For the relief of the poor .	253,405	0	22[illegible],059	10	19[illegible]	[illegible]	18[illegible]	0
In suits of law, removals, &c.	15,775	0	11,625	2	9,501	14	7[illegible]	9
Payments towards the county-rate . .	133,192	0	68,827	9	71,854	13	..	
For all other purposes			64,888	3	60,520	13	50,923	
Total money expended	£402,372	0	367,400	4	335,734	8	251,512	

The saving effected in the sum expended in 1837, as compared with that expended in 1834, was therefore about 37½ per cent.; and the saving effected, comparing the same periods, in the expenditure for the relief of the poor, was 23½ per cent.

The number of turnpike trusts in Lancashire, as ascertained in 1835, under the Act 3 and 4 Wm. IV., chap. 80, was 62; the number of miles of road under their charge was 631. The annual income arising from tolls and parish compositions in lieu of statute duty was, in 1835, 139,833*l.*, and the annual expenditure in the same year was as follows:—

	£	s.	d.
Manual labour . .	£30,407	9	5
Team labour and carriage of materials	10,141	0	10
Materials for surface repairs .	18,389	13	9
Land purchased . .	1,037	6	10
Damages done in obtaining materials	234	12	8
Tradesmen's bills . .	2,637	6	10
Salaries of treasurer, clerk, and surveyor	5,515	10	5
Law charges . . .	1,345	9	2
Interest of debt . .	38,171	2	0
Improvements . . .	16,532	4	2
Debt paid off . . .	15,956	0	0
Incidental expenses . .	3,272	12	10
Estimated value of statute duty performed . . .	229	2	6
Total expenditure	143,869	11	5

The county expenditure in 1834, exclusive of that for the relief of the poor, was 39,169*l.* 3*s.* 4*d.*, disbursed as follows:—

	£.	*s.*	*d.*
Bridges, building and repairs, &c.	116	3	4
Gaols, houses of correction, and maintaining prisoners, &c.	5,479	0	2
Lunatic asylums	1,934	9	2
Prosecutions	19,903	11	11
Clerk of the peace	778	12	11
Conveyance of prisoners before trial	3,075	18	9
Conveyance of transports	1,949	5	7
Vagrants, apprehending and conveying	512	2	7
Constables, high and special	1,563	3	3
Coroner	2,199	0	6
Miscellaneous	2,467	15	2
Total expenditure	39,169	3	4

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 10,563, 13,873, and 16,064, respectively; making an average of 1509 annually in the first period, of 1982 in the second period, and of 2295 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect of whom any costs were paid out of the county-rate, was 1705, 1968, and 2018 respectively.

Among the persons so charged with offences there were committed for

	1831.	1832.	1833.
Felonies	1628	1857	1876
Misdemeanors	77	110	142

There is no return of the committals in each of the same years; nor of the number convicted or acquitted.

At the assizes and sessions in 1837 there were 2809 persons charged with criminal offences in this county. Of these 167 were charged with offences against the person, 81 of which were for common assaults, 111 persons were charged with offences against property committed with violence, 2292 with offences against property committed without violence; 5 were committed for arson, 3 for forgery, 52 for uttering counterfeit money, &c., and 179 for riot or various other misdemeanors. Of the whole number committed, 2190 were convicted, 374 were acquitted, and as respects the remaining 245 no bill was found, or there was no prosecution. Of the whole number of persons convicted, 29 were sentenced to death, but none were executed, their sentences being commuted, 8 to transportation for life, 12 for 15 years, 2 for 7 years, and 7 to different periods of imprisonment not exceeding 2 years; 30 were sentenced to be transported for life, and 111 for different periods; 1 was sentenced to 3 years' imprisonment, 72 for not more than 2, 278 for one year or under, and 1359 for 6 months or under; 25 were whipped or fined, and one was pardoned. Of the whole number of offenders, 2171 were males and 638 were females; 1259 could neither read nor write; 1349 could read and write imperfectly; 160 could read and write well; 11 had received superior instruction; and the degree of instruction of the remaining 30 could not be ascertained.

The number of persons registered in 1837 to vote for county members was—in the northern division 9691; in the southern division 17,754: together 27,445. Of these 16,669 were freeholders, 2827 leaseholders, 1265 copyholders, 6396 occupying tenants, 253 trustees, 35 mortgagers: total 27,445; being one in 48 of the whole population, and one in 11 of the male population twenty years and upwards, as taken in 1831. The expenses of the last election of county members to parliament were to the inhabitants of the county 457*l.* 8*s.* 3*d.*, and were paid out of the general county rate.

This county contains 26 savings' banks; the number of depositors and amount of deposits on the 20th of November, in each of the following years, were as under:—

	1832.	1833.	1834.	1835.	1836.	1837.
Number of Depositors	26,687	29,160	32,613	36,744	40,861	40 519
Amount of Deposits	£911,141	£970,994	£1,075,318	£1,198,667	£1,334,058	£1,317,534

The various sums placed in the savings' banks in 1835, 1836, and 1837, were distributed as under:—

	1835.		1836		1837.	
	Depositors.	Deposits.	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	17,978	£137,220	19,687	£154,856	19,807	£151,584
" 50	11,431	347,557	13,048	393,592	12,588	383,494
" 100	4,730	325,302	5,235	360,756	5,208	357,150
" 150	1,526	184,671	1,733	208,908	1,727	207,228
" 200	865	146,528	940	160,450	995	168,160
Above 200	214	57,289	218	55,496	194	49,918

Education.—The following summary is taken from the parliamentary returns on education made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	123		
Number of infants at such schools; ages from 2 to 7 years:—			
Males		2,863	
Females		2,996	
Sex not specified		501	
			6,360
Daily schools	2087		
Total of children at such schools:			
Males		49,439	
Females		34,801	
Sex not specified		6,934	
			91,174
Daily schools	2220		
Total of children			97,534
Sunday schools	964		
Number of children at such schools; ages from 4 to 15 years:—			
Males		91,043	
Females		95,559	
Sex not specified		12,175	
			198,777

Assuming that the population between the ages of 2 and 15 had increased in the same proportion as the whole of the population had increased during the ten years preceding 1831, and supposing that this part of the population bears the same relative proportion to the whole as it did in 1821, we find by approximation that the number of children residing in Lancashire between the ages of two and fifteen in 1834 was 481,266.

Of the Sunday-schools fifteen are returned from places where no other school exists, and the children, 1522 in number, who are instructed therein cannot be supposed to attend any other school. At all other places Sunday-school children have an opportunity of resorting to other schools also; but in what number, or in what proportion duplicate entry of the same children is thus produced, must remain uncertain. Eighty schools, containing 11,183 scholars, which are both daily and Sunday-schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. At some of the Sunday-schools in this county, especially at Blackburn, Great and Little Bolton, Chorley, Manchester, Salford, and Oldham, a few persons receive instruction who are upwards of twenty years of age. Making allowances for these causes it may be a tolerably correct statement to say that about one-half of the children between the ages of two and fifteen were receiving instruction in this county at the time this return was made.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars		Subscrip. and payment from scholars	
	Schls.	Scholars	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars
Infant Schools	..	..	11	1411	102	2,624	20	2,325
Daily Schools	241	12,454	82	10462	1691	58,033	73	10,225
Sunday Schools	19	2,369	900	188036	10	819	35	7,553
Total....	260	14,823	993	199909	1803	61,476	128	20,103

The schools established by Dissenters, included in the above statement, are—

	Schools.	Scholars.
Infant schools	10	1,467
Daily schools	90	7,917
Sunday-schools	490	110,024

The schools established since 1818 are—

		Scholars.
Infant and other daily schools	1553 containing	63,609
Sunday-schools	756	154,038

Eighty-four boarding-schools are included in the number

of daily schools given above. No school in this county appears to be confined to the children of parents of the Established church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists and Roman Catholics; the latter, to the amount of 15,916 children, are distinctly specified in the returns from this county.

There are lending-libraries of books attached to 321 schools in the county of Lancashire.

LANCASTER. [LANCASHIRE.]

LANCASTER, SIR JAMES, a skilful seaman, who received for his services the honour of knighthood from Elizabeth, conducted the first voyage undertaken by the newly constituted East India Company, A.D. 1600-3, and established commercial relations with the princes of Achim in Sumatra and Bantem in Java. He was a firm believer in a north-west passage; and his authority had much weight in promoting the numerous attempts made in that enterprising age to discover one. Lancaster's Sound, a deep inlet in Baffin's Bay, 74° lat., was named after him by Baffin, one of our most successful explorers. It is nearly certain, from the last discoveries, that this inlet does actually lead into the Arctic Ocean, north of America. Relations of Sir J. Lancaster's first voyage to the East Indies in 1591, and of a successful predatory voyage against the Portuguese in Brazil, in 1594, are given in Hakluyt's 'Voyages,' vol. iii.: his voyage to the East Indies in 1600-3 is contained in Purchas's 'Pilgrims,' vol. i. He died in 1620.

LANCELOT, CLAUDE. [PORT ROYAL.]

LANCE'OLA, a genus of Crustaceans established by Mr. Say on a single species, *Lanceola pelagica*, two females of which only he appears to have seen taken on the coast of America, in the Gulf Stream. M. Desmarest is of opinion that the genus belongs to the *Amphipoda* by reason of its vesicular oblong *branchiæ*, to the number of ten, placed at the internal base of the feet, except those of the first and seventh pairs, and that it especially approaches *Phronima* in its caudal appendages, which consist of three pairs of lanceolate styles, which are double and supported by depressed linear peduncles annexed to the sides by three rings which compose the tail. Its *mouth*, provided with two triarticulate filiform palps and bifid jaw-feet, bears analogy to that of the *Cloportes*. Its general *form* is that of the genus *Praniza* (which M. Desmarest considers to be an Isopod); its *antennæ*, composed of four joints, have the last joint not divided, and the inferior antennæ are the longest. The superior antennæ have their base hidden. The *eyes* are elongated; the *front* is concave; the *feet* are fourteen in number, and simple: the two first pairs are compressed, and the sixth is the longest. The *head* is short and transverse. The *body* is soft, and covered with membranous integuments; the *tail* is depressed, narrower than the body, and its terminal segment is attenuated between the posterior caudal styles.

LANCEROTA, or LANZAROTE. [CANARIES.]

LANCIA'NO. [ABRUZZO.]

LAND in its most restricted legal signification is confined to arable ground. In this sense the term is construed in original writs, and in this sense it is used in all correct and formal pleadings.

By the late statute of Wills, 1 Victoria, c. 26, s. 26, a devise of the land of the testator generally, or of the land of the testator in any place or in the occupation of any person mentioned in the will, is to be construed to include customary, copyhold, and leasehold estates to which the description will extend, as well as freehold estates, unless a contrary intention appear by the will. In its more wide legal signification land extends also to meadow, pasture, woods, moors, waters, &c.; but in this wider sense the word generally used is lands: the term land or lands is taken in this larger sense in conveyances and contracts.

In conveying the land, houses and other buildings erected thereon, as well as mines, &c. under it, will pass with it, unless specially excepted. A grant of the vesture of certain land is more restricted, and transfers merely a particular or limited right in such land, and the houses, timber, trees, mines, and other real things, which are considered as part or parcel of the inheritance, are not conveyed, but only corn, grass, underwood, &c., the produce of the land. Other limited or particular rights, as fishing, cutting turf, &c. may be granted, which confer no interest in the land itself, or, as it is called, the realty, but only the benefit of such particular privileges. But a grant of the fruits and profits of the land conveys also the land itself. Absolute ownership of land carries with it the right to the possession downwards of the minerals, waters, &c., and also upwards, agreeably to the maxim, 'cujus est solum, ejus est usque ad cœlum.'

Ownership of land is expressed in the English law by the term *real* property, in contradistinction to *personal* property, which consists in money, goods, and other movables.

In some parts of England the word 'land' is frequently used to denote the fee simple as distinguished from a less estate, without reference to the nature of the property. Thus it is usual to say, A has a lease of such an estate or such a house, but B has the land, *i.e.* the reversion or remainder in fee.

Land is legally considered as enclosed from neighbouring land, though it lie in the middle of an open field, and may therefore be called a *close;* and the owner may subdivide this ideal close into as many ideal parcels as he pleases, and may, in legal proceedings, describe each of these parcels, however minute, as his close. An illegal entry into the land of another is therefore called, in law, breaking and entering his close, and the remedy is by the action of trespass 'Quare clausum fregit;' it having been necessary, when writs were framed in Latin and all common law proceedings were entered on the rolls of the court in that language, to insert the words 'Quare clausum fregit' in the king's writ, or the party's plaint, by which the action was commenced, and also in the declaration wherein the nature of the injury was more circumstantially detailed.

Land derelict, or left dry by the sudden receding of the sea, or of the water of a navigable river, belongs to the king by his prerogative; but land formed by alluvion, that is, by gradual imperceptible receding of any water, or by a gradual deposit on the shore, accrues to the owner of the adjoining land.

(*Doctor and Student; Co. Litt.;* Comyn's *Dig.*)

LAND-TAX is a branch of the public revenue of England, which was first raised in its present form in 1692. It was contrary to the spirit of the feudal system that pecuniary assessments should be made upon land held by knight's service, the personal military services of the tenants being in this and in other countries considered as entitling them to exemption from tallage, or direct taxation. The first inroad upon this principle in England was the payment of escuage as a commutation for personal service. This was followed by pecuniary grants made by parliament in the form of subsidies upon the abolition of the military tenures by the Long Parliament, which was afterwards confirmed by the first parliament of Charles II.; the ground of exemption ceased, and land as well as personal estate, was made the subject of assessment.

Until 1799 the land-tax was granted by parliament for only one year, and the acts under which it was levied were renewed annually; but in that year an act was passed rendering the tax perpetual, the object of this alteration being to facilitate the raising of money by means of its redemption. Under the conditions of this act the tax was offered for sale first to the owner of the land upon which it was chargeable, and if the purchase were declined by him then to any other person, in which latter case the purchaser was to receive the amount half-yearly from the receiver-general. The payments were in either case to be made not in money, but by the transfer of an equivalent amount of the national debt. The advantage stipulated on the part of the public was, that if redeemed by the owner of the land, the interest or annuity transferred in payment should exceed the annual amount of the tax redeemed by 10 per cent.; and if purchased by an indifferent party, that the interest or annuity should exceed that annual amount by 20 per cent.: for example, if the land-tax to be redeemed by the owner amounted to 5*l.* per annum, the sum of 3 per cent. stock to be paid for the same would be 183*l.* 6*s.* 8*d.*, the annuity in respect of which would be 5*l.* 10*s.*, or 10 per cent. advance upon the tax. If the purchaser were a stranger, the amount of 3 per cent. stock would be 200*l.*, or an annuity of 6*l.* per annum, being 20 per cent advance. This measure met with only a partial success, which occasioned several modifications to be made in its terms with the view of rendering them more acceptable to the landowners. The most important of these modifications were passed in 1811 and 1812, when the management was transferred from special commissioners to the Commissioners for the Affairs of Taxes; the preference given in previous acts to the owners was revoked, except as

regarded priority where competition appeared, and the purchase-money was made payable by thirty-two half-yearly instalments. It is not possible to give any detailed account of the amount redeemed from time to time under these acts. It appears from a report made by the commissioners in May, 1828, that up to that time 'the number of sales effected had been 3593, the total value thereof 1,438,513*l.* 4*s.* 3*d.*, and the total amount of land-tax redeemed thereby could not be fairly estimated at less than 63,100*l.* per annum.' Since that time it does not appear that any further account in reference to this plan has been called for by parliament.

The rate at which this tax is charged is 4*s.* in the pound on the annual value. The amount which it has yielded to the exchequer in each year from 1828 to 1837 has been as follows:—1828, 1,168,254*l.*; 1829, 1,172,068*l.*; 1830, 1,182,409*l.*; 1831, 1,161,312*l.*; 1832, 1,184,340*l.*; 1833, 1,155,019*l.*; 1834, 1,203,578*l.*; 1835, 1,199,783*l.*; 1836, 1,199,600*l.*; 1837, 1,192,635*l.*

LANDAU is a strong fortress in Bavaria, situated in 49° 11′ N. lat. and 8° 9′ E. long., in a beautiful valley on the river Queich, and on a canal, by which provisions, materials for building, &c., are conveyed to it by water. Though small, it is celebrated in military history, having sustained several memorable sieges. It is a regular octagon, with 8 curtains, covered by 7 bulwarks, 3 redoubts, 7 lunettes, 1 fort, 3 whole and 2 half bastions, and surrounded by broad moats. The barracks and casemates are bomb-proof. It is very regularly built within, has two gates, a large parade, a church, which the Protestants and Roman Catholics have in common, a gymnasium, various public offices, and manufactures of calico, woollens, linen, hats, fire-arms, copper and iron foundries, &c. The population amounts to rather more than 6000, besides the garrison. Landau, which was formerly an imperial city, was ceded to France in 1680, and fortified by Louis XIV. In 1702 it was taken by the Austrians, but recovered by the French in 1703. After the battle of Blenheim in 1704 it again fell into the hands of the Austrians, who retained it till 1713, when it was again ceded to France. In 1793 it was closely but unsuccessfully besieged by the Austrians and Prussians. The first treaty of Paris, in 1814, left it to the French; but at the second treaty, in 1815, it was declared a fortress of the German Confederation, under the protection of Bavaria, a part of whose contingent to the army of the Confederation forms the garrison.

LANDEN, JAMES, a mathematician of the last century, was born at Peakirk, near Peterborough, in January, 1719, and died at Melton, near the same place, January, 1790. He was for many years agent to Earl Fitzwilliam; but no details have been published of his life, neither have we heard of any which it would be worth while to give.

The writings of Landen stretch over a long period, from his first essays in the Ladies' Diary, in 1744, to his paper on rotatory motion in the Phil. Trans. for 1785. The thing by which he is now most known is his attempt to derive the differential calculus from algebraical principles, often called his residual analysis. [DIFFERENTIAL CALCULUS.] His writings, though they contain many curious and original theorems, yet are mostly upon isolated subjects, and, except as being all the work of one man, need no more detailed description than a volume of miscellaneous memoirs. They relate for the most part to points of the integral calculus, and of dynamics; we may take, for instance, his determination of the arc of an hyperbola by means of two elliptic arcs, in the Phil. Trans. for 1775.

The writings of Landen which are not contained in the Philosophical Transactions are, his 'Mathematical Lucubrations,' 1755; the 'Residual Analysis,' 1764; two volumes of Memoirs, the first published in 1780, the second written near the end of his life, and published posthumously; Tracts on Converging Series, 1781-82-83.

LANDER. [QUORRA.]

LANDERNAU. [FINISTERE.]

LANDES, LES, a name formerly given to the wild sterile districts stretching along the coast of Guyenne and Gascogne, between the Gironde and the Adour. The name, which denotes heath or waste open country, is sufficiently descriptive of its natural character, though it varies considerably, the part near the coast being the wildest. The district was subdivided into Les Landes, properly so called, including the territories of Dax, Albret, Tartas, and Urt; Le Pays de Marenne between the Adour and the sea; Le Pays de Marausin, on the coast, north of Le Pays de Marenne; the districts of Chalosse and Marsan inland, toward the east; Les Landes de Bordeaux, in the neighbourhood of that city; Les Petites Landes, between Bazas and Mont de Marsan; and Les Grandes Landes, comprehending the central parts of this extensive waste. The former high-road from Bordeaux to Bayonne, and into Spain, ran direct through Les Grandes Landes; but has been abandoned for a more circuitous inland route through Les Petites Landes, by Bazas, Mont de Marsan, and Dax. The physical characteristics of the country are noticed in the following article.

LANDES, a department in the south-west of France, bounded on the north by that of Gironde, on the east by those of Lot et Garonne and Gers, and on the south by that of Basses Pyrénées: on the west it is bounded by the sea-coast running in an almost undeviating line north and south to the mouth of the Adour. The form of the department approximates to that of a quadrangle, having its northern side 73 miles long, its eastern side 42 miles, its southern side 60 miles, and its western side, or coast line, 69 miles. Its area is estimated at 463 square French leagues (25 to a degree), or 3541 square English miles, just about the area of the two English counties of Norfolk and Suffolk. The population in 1836 was 284,918, or above 80 to a square mile, showing the density of the population to be very little more than half the average of France; and far below that of any county in England except Westmoreland. Mont de Marsan, the capital, is in 43° 53′ N. lat. and 0° 30′ W. long.; 365 miles in a direct line south by west of Paris, or 467 miles by the road through Orléans, Blois, Tours, Poitiers, Angoulême, Bordeaux, and Bazas.

The surface is generally flat. The range of hills which separates the basin of the Adour from that of the Garonne skirts the department on the north-east side, and some of the lower slopes of the Pyrenees extend into it on the south, but it has no considerable elevations. The rocks which pervade it generally belong to the supercretaceous group, but just on the southern border the strata between the chalk and the newer red or saliferous sandstone crop out chalk is not found. This southern part of the department yields building-stone, marl, porcelain clay, and some iron. Along the coast is a range of sandy downs, skirted on the land side by a line of étangs, or pools, of which those of Orx, Tosse, Soustons, Vieux Boucau, Léon, St. Julien, Aureillan, Parentes or Biscarosse, and Sanguinet or Cazau, are the chief. The last three communicate by a narrow stream with each other, as do those of Tosse, Soustons, and Vieux Boucau: several of them also communicate with the sea.

The chief rivers of the department are: the Adour, which waters the southern part; with its tributaries, the Midouze, formed by the junction of the Midou and the Douze, the Gabas, the Luy de France, and the Gave de Pau, beside a great number of streams which flow into these. The only river in the northern part, of any size, is the Leyre, which is formed by the junction of two streams both rising within the department. The Adour enters the department on the east side, and passes by Aire and Grenade to St. Sever, where the navigation commences; it shortly after receives the Gabas on the left bank, and flows west to the junction on its right bank of the Midouze, which is navigable from Mont de Marsan. It afterwards receives the Luy and the Gave from the Pyrenees on its left bank; both these streams are navigable for a short distance. The river navigation of the department has an extent of about 115 or 116 miles; of which the navigation of the Adour is 78 miles: that of the Midouze about 27 miles; and that of the other two about 10 or 11 miles together. The rapidity of the stream renders the navigation of the Adour of very little use.

There are no navigable canals in the department. Several have been contemplated: one was projected as far back as 1781 by Dupré de St. Maur, then intendant of Guyenne; it was to run from the Gironde below Bordeaux, by the line of the étangs to the mouth of the Adour, or by the étangs to the Bassin d'Arcachon, and thence by the course of the Leyre and the Estrigon to the Midouze near Mont de Marsan. Another canal was projected to run from the Garonne at Bordeaux to the Adour at Dax. A company was formed and a royal ordonnance obtained in 1821, for executing one of these works. A third canal has been projected, and we believe something has been done towards its execution, from the Gelize, a stream belonging to the system of the Garonne, to the Midouze near Mont de Marsan. Though

little has been done in these great works, we believe the projects have not been given up.

The high road from Paris by Bordeaux into Spain enters the department at Le Poteau, and runs south-west by Roquefort, Mont de Marsan, Tartas, and Pontons, to St. Esprit, a suburb of Bayonne, where it crosses the Adour into the adjacent department of Basses Pyrénées. A road branches off from this at Roquefort, and runs south by Villeneuve de Marsan and Aire to Pau, capital of the dep. of Basses Pyrénées; and a road from St. Esprit runs east by Peyrehorade to the same city. There are other roads from Tartas, by Grenade and Cazères, to Aire; and from Mont de Marsan, by St. Sever, to Orthes, in the department of Basses Pyrénées. The older and more direct road from Bordeaux to Bayonne, by the Grandes Landes, passes by detached posting-houses and miserable villages. It is indeed in many parts scarcely a road, but rather a track across a wild sandy desert; and is now almost deserted. The aggregate length of the government roads is 287 miles, viz. 175 in repair, 27 out of repair, and 85 unfinished. The aggregate length of the departmental roads is 207 miles, of which more than half is unfinished. The bye-roads and paths are in number 1439, in aggregate length above 3000 miles.

The agricultural produce of the department is small: in the part south of the Adour, some maize and millet and rye are grown, and a little wheat: there are considerable vineyards, which produce tolerable wine; much fruit is grown, especially peaches, and also madder. North of the Adour the country consists of wide plains, on which numerous sheep of a hardy breed find scanty pasturage. In some parts the soil, composed of an ash-coloured sand, is too unproductive even for sheep-walks. Forests of pine occupy a vast extent of country. The pine (*pinus maritima* of Linnæus) acquires, in the sandy and else unproductive wastes, a height beyond that which it attains in other parts of France; it yields wood for the carpenter and masts for the shipwright: pitch is extracted from it, and charcoal is manufactured. The population of the wilds is scanty. The peasantry live in solitary cabins: the head of the family engages in the cultivation of the soil, where its sterility is diminished by nature, or counteracted by abundance of manure: the younger branches go, perhaps twenty miles from home, to make charcoal in the forests, or to attend their flocks. They traverse the deserts on long stilts, that they may pass dry-footed through the morasses which from time to time intervene. The shepherds watch their flocks, mounted on these stilts, and resting on their staves, the tops of which are broad and rounded to afford them a seat. They employ the leisure which their occupation allows in knitting large woollen stockings. Some good horses are reared on the wastes; mules are bred; and some swine are kept. Poultry, bees, and silk-worms are objects of attention in the department.

The department is divided into three arrondissemens; as follows:—

Arrondissement.	Situation.	No of Com. in 1837.	Area in sq. miles.	Population. 1831.	1836.
Mont de Marsan	N.	117	1985	91,595	93,292
St. Sever . .	S. E	114	661	90,446	90,500
Dax	S. W.	108	895	99,463	101,126
		339	3541	281,504	284,918

The number of cantons, or districts under a justice of the peace, is twenty-eight.

In the arrondissement of Mont de Marsan are the capital, on the Midouze; Roquefort and St. Justin on the Douze, Villeneuve de Marsan on the Midou, Grenade and Cazères on the Adour, and Houtans on a stream flowing into the Midou. Mont de Marsan was built by Pierre, Viscount of Marsan, A.D. 1140. It is a handsome town at the confluence of the Douze and the Midou, approached by fine avenues of trees, and having broad straight streets, neat well-built houses, and a handsome bridge over the Midou. There is an office for the prefect of the department, and a justiciary court and prison of appropriate architecture. There are also a theatre, an hospital, and some barracks. The population was 3774 in 1831, and 4082 in 1836. There are no manufactures, except a trifling one of sailcloth; but the town is the general mart for the supply of the neighbouring country, and is the residence of many genteel families. During the war, it was one of the stations for the inland communication carried on by means of the Garonne and the Midouze and the Adour, between Bordeaux and Bayonne. Mont de Marsan has a high school, a library of 10,000 or 12,000 volumes, an agricultural society a departmental nursery-ground and several baths. Roquefort has some lime-kilns and potteries; some trade is carried on in cattle, wool, honey, and wax. The population is about 1500. Villeneuve de Marsan has about as many inhabitants as Roquefort, who carry on considerable trade at their markets and their fairs. Some miles north of Mont de Marsan is Labrit or Albret, now a village, but formerly the capital of a county, the lords of which played an important part not only in the province, but in the kingdom at large.

In the arrondissement of St. Sever are St. Sever, Aire, Mugron, and Pontons, on the Adour; Tartas on the Midouze; Souprosse between Tartas and St. Sever; Pimbo, Arboucave, Samadet, and Montaul, on or near the Gabas; Hagetmau, or Hagetmeau (pop. in 1831, 3053), on the Louts, a feeder of the Adour, and on the road from St. Sever to Orthes; Geaune, Loubouer, and Coudures, on the Bas, a feeder of the Gabas; and Mant, Amou, and Pomares, on or near the Luy and its branches. St. Sever is pleasantly situated on an elevation near the Adour, over which there is a handsome bridge. The town is neat and well built: it has a terrace commanding an extensive prospect. The population of the commune was 5949 in 1831, and 5863 in 1836; about half the population is in the town itself. Aire is described elsewhere. [AIRE.] Hagetmeau has many tan-yards. There are the ruins of an antient castle. Tartas is in a pleasant situation; and the upper town, separated by the Midouze from the lower town, commands an extensive prospect. The inhabitants, about 2000 in number, carry on considerable trade with Bayonne, by means of the Adour.

In the arrondissement of Dax are Dax (pop. of the commune in 1831, 4716, in 1836, 4776), and Saint Esprit (pop. of commune in 1831, 5895; of town, 4108), a suburb of Bayonne, on the Adour; Cap Breton and Vieux Boucau, on or near the coast; and Peyrehorade, Nastingues, Sorde, and Habas, on or near the Gave. Dax and St. Esprit are noticed elsewhere. [DAX; BAYONNE.] Cap Breton was once of greater importance than now, as its extent and the number of ruined and deserted habitations testify. It is on the bank of a rivulet, the mouth of which once formed a haven. Vieux Boucau (*i.e.* Old Mouth) was formerly a place of consequence. The mouth of the Adour at Bayonne having been blocked up by sand-hills, the river forsook its channel, and flowing northward on the inner or land side of the downs, which line the coast, found no outlet until it reached Vieux Boucau, where it entered the sea, forming a haven which gave some consequence to the place. The river pursued this course for nearly 140 years, or, according to some writers, above 200 years, until, in A.D. 1579, the Bayonne mouth was cleared and reopened. This restoration of the channel to its former course caused the downfal of Vieux Boucau, which now contains scarcely thirty inhabited houses. Peyrehorade (pop. in 1831, 1740 town; 2453 whole commune) is on a hill on the right bank of the Gave de Pau: it has a considerable weekly market. There is a poor-house or hospital.

The manufactures of the department are not considerable. There are many tan-yards; some woollen cloths and coarse woollen stuffs, sail-cloth, and table-linen are manufactured. The exports of the department consist of hams, sheep, fruit, cork, deals, pitch, resin, &c. There is no port along the coast; but that of Bayonne, at the mouth of the Adour, is close upon the border of the department.

The department is in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Pau. It forms the diocese of Aire, the bishop of which is a suffragan of the archbishop of Auch. The diocese was in existence as early as the beginning of the sixth century. The department is in the eleventh military division, the head-quarters of which are at Bordeaux. It sends three members to the Chamber of Deputies. In respect of education it is considerably below the average of France. Of the young men enrolled in the military census of 1828-9, only twenty-eight in every hundred could read and write, while the average of France was more than thirty-nine in every hundred.

LANDING-WAITER, an officer of the customs, whose duties consist in taking an accurate account of the number, weight, measure, or quality of the various descriptions of

merchandise landed from foreign countries or colonial possessions. Landing-waiters likewise attend to the shipment of all goods in respect of which bounties or drawbacks are claimed. These officers are likewise called searchers.

LANDGRAVE. In the early history of Germany the *Grave* was an inferior judge, who was chosen by the people for his experience in business. He was hence called *Grau* or *Grave* (*i. e.* gray, or aged), or more probably from the old German *Gerefa*, receiver, afterwards judge, which subsequently was changed to the present German title *Graf*, which we translate Count. Under the Franks the Graves were no longer chosen by the people, but appointed, like the dukes, by the kings, and were judges of a district (called a *Gau*, a division of which there are still some traces in Germany, as the Rheingau), in which they exercised the rights of government in the king's name, having especially the administration of justice, the police, and the royal revenues. After the time of the Carlovingian kings the following classes were distinguished: *Palgraves* (Pfalzgraf, from *pfalz*, court), who sat in judgment at the king's court, and examined whether a suit must be decided by the king himself; *Margraves* (properly *Markgraves*, Markgraf), from *mark*, a frontier or boundary, who were keepers of the frontiers (lords of the marches); *Landgraves*, after the eleventh century, so called in contradistinction to the Markgraves, they being governors, or graves, of the interior, who were under the dukes, and to whom the graves were subordinate. They very soon however made themselves independent of the sovereign. The Markgraves of Thüringen assumed the title of Landgraves towards the end of the eleventh century, and it was obtained in the next century by the Graves of Hesse, in whose dominions the title is still borne (with the exception of the sovereigns of Hesse-Cassel and Hesse-Darmstadt and their presumptive heirs) by all the members and collateral branches of the reigning families.

LANDGUARD, FORT. [HARWICH.]

LANDRE'CY, or LANDRECIE. [NORD.]

LANDSCAPE GARDENING. [GARDEN.]

LANDSCRONA is a town in Sweden, on the shores of the Sound, at nearly an equal distance between Cape Kuller and the town of Malmö, and opposite the small island of Hven, 55° 51′ N. lat. and 12° 8′ E. long. It is situated in the province of Skonen, and in the lan of Malmö, in a level and fertile country, in which much tobacco is grown. Its harbour is rather spacious and very safe. Being situated nearly opposite the capital of Denmark, the harbour as well as the town are well fortified. Its population amounted in 1825 to 3722, and is supposed to exceed at present 4000 souls. It carries on a considerable trade in corn, and has some manufactures of tobacco and starch, and also some sugar-houses, tanneries, and soap-houses, the produce of which is sent to some of the neighbouring harbours of Sweden. There is a good grammar-school in the town.

LANDSHUT, one of the prettiest and most agreeable towns in the kingdom of Bavaria, lies in 48° 30′ N. lat. and 12° 7′ E. long. It is situated in a delightful country on the banks of the Isar, over which there is a new bridge. The principal portion of the town consists of two long broad and straight streets, connected by a number of narrower ones. The houses are well built of brick, and many of them have gardens. The open parts are two market-places and the parade-square. The most remarkable buildings are the palace, called the Neue Bau (New Building), the house of the provincial assembly, an hospital, and two parish churches, of which St. Martin's is celebrated for its beautiful steeple, one of the loftiest in Germany: this steeple, which is said to be 456 feet in height, commands a magnificent and most extensive view over almost the whole plain of Bavaria. On a mountain near the town is the antient castle of Trausnitz, which was formerly a strong fortress, and the residence of the dukes of Bavaria. On the declivity of this mountain is the botanic garden. A suburb is built on an island formed by the Isar. In the year 1800 the university of Ingolstadt was transferred to Landshut, but in 1826 it was removed to Munich. There are however still a seminary of Catholic divinity, a gymnasium, a lyceum, and a chirurgical clinical school. There are some manufactories of cloth, leather, starch, playing-cards, snuff, and tobacco, but all on a small scale; the breweries and distilleries are however extensive. Landshut was formerly an important fortress, as its name, 'Guard of the Country,' seems to imply. It has accordingly suffered severely in times of war, as in 1742, 1743, and from the French invasions in 1796, 1800, 1805, 1809. The population is now nearly 8000.

LANFRANC, Archbishop of Canterbury, was born at Pavia, A.D. 1005, where he was instructed in grammar and logic. After the death of his father, who was a counsellor to the senate of that town, he spent some years in the study of rhetoric and civil law at Bologna, whence he returned to his native city, and commenced as advocate in the courts of law. Thinking this too narrow a sphere, he removed into France, and opened a school at Avranches, which was soon crowded with students of high rank. In a journey to Rouen he had the misfortune to be robbed and left bound in a wood, where he was found the next morning by some peasants, who carried him, almost dead, to the abbey of Bec. Here he was treated with so much tenderness, that when he recovered he became a monk in that abbey, A.D. 1041. At the end of three years he was chosen prior of Bec. Here he entered into a long and violent controversy with Berenger, archdeacon of Angers and master of the academy of Tours, on the subject of the Eucharist, which at that day made no little noise in the church. His fame ultimately procured him the favour of his sovereign, William duke of Normandy, who made him one of his counsellors, employed him in an important embassy to the pope, and appointed him, A.D. 1062, abbot of his newly-erected monastery of St. Stephen at Caen. Here he established a new academy, which became no less famous than those which he had before set up at Avranches and Bec. When the see of Canterbury became vacant by the deposition of Stigand, William, who had effected the conquest of England, procured his election to that see, August 15, A.D. 1070, and with some difficulty prevailed upon him to accept the station. To the church of Canterbury he proved a great benefactor, by asserting its right to the primacy of England, by recovering many of its possessions, and by rebuilding the cathedral. During a large portion of the reign of William the Conqueror, Lanfranc enjoyed a high degree of favour; and had the chief direction of affairs, both in church and state, under William Rufus, till the time of his death, which happened May 28, A.D. 1089, in the 84th year of his age.

Several of our historians who were almost his contemporaries speak in very advantageous terms of the genius and erudition of Lanfranc; and some of them, who were personally acquainted with him, represent him as the most learned man of his age. His writings consist of commentaries on St. Paul's Epistles, sermons, letters, and his Treatise on the Eucharist against Berenger. This last production rendered him a prodigious favourite with the literary historians of the Church of Rome. His works were collected and edited by Lucas d'Achery, at Paris, fol., 1648.

(*Histoire Littéraire de la France*, tom. viii.; Tanner, *Bibl. Brit. Hib.*; Henry's *Hist. of Great Britain*, 8vo. ed., Lond., 1805, vol. vi., pp. 126 128.)

LA'NGAHA. [VIPERIDÆ.]

LANGHORNE, JOHN, was born at Kirkby Stephen, in Westmoreland, in 1735, and educated at the school of Appleby. Being too indigent to proceed to the university, he had recourse to private tuition, took orders, and in 1760 entered himself as a ten-year-man at Clare Hall, Cambridge. Having fallen in love with a daughter of the gentleman in whose family he lived, he offered her his hand, and on being refused quitted his employment, and repaired to London, where he obtained a curacy, helped to support himself by his pen, and soon became a well-known and popular author. Dr. Hurd appointed him assistant preacher of Lincoln's Inn Fields, and a short poem, called 'Genius and Valour,' written in defence of the Scotch against the coarse abuse of Churchill and others, procured for him, from the university of Edinburgh in 1766, the degree of D.D. In the following year he renewed his suit, and was accepted. The living of Blagden in Somersetshire was purchased for him; but in the first year of his marriage his happiness was interrupted by the death of his wife in childbed. To solace his grief he undertook, with his brother, the new translation of Plutarch's Lives, published in 1771, by which he is best known. In accuracy this has doubtless the advantage over Sir Thomas North's old version from the French of Amyot, but it is much inferior in spirit and effect. Having married again, he lost his second wife in 1776, also in childbed. This double disap-

pointment is said to have led him into intemperate habits. He died in April, 1779.

Langhorne wrote tales, poems, chiefly short, and sermons, which did not establish for him much reputation as a divine. His prose is flowery and sentimental, his verses pleasing and harmonious but over ornamented, seldom rising above prettiness, and often spoiled by affectation. They have a place in Chalmers's 'British Poets.' For the list of Langhorne's works see Watt, *Bibl. Brit.* The poems, published by his son in 1802, contain a Life of the author.

LANGELAND. [DENMARK; FUNEN.]

LANGRES, a town in France, capital of an arrondissement in the department of Haute Marne, 167 miles east-south-east of Paris. This town takes its name from the Lingones, one of the Celtic nations. Strabo gives to this nation the names Λίγγονες and Λιγκάσιοι: Ptolemy calls them Λόγγωνες. They were among the tribes who, in the time of Cæsar, embraced the Roman alliance, and they retained a considerable degree of liberty even under the emperors. Their chief town was called Andomatunum; in the later period of the Roman empire it was called, after the name of the people, Lingones; and thence by corruption Langres. It was a place of great importance under the Romans: many antiquities have been found; and there yet remain the ruins of two triumphal arches, one erected to Probus and one to Constantius Chlorus. Langres was much injured in the invasion of Gaul by the barbarous tribes which overwhelmed the Roman empire. It stands on an elevated site on the northern slope of the range of hills which unite the Cévennes with the Vosges, and near the sources of the Marne. It is surrounded by old fortifications raised during the middle ages. It is not well built, but is adorned with fountains and promenades. The cathedral is remarkable for the beauty of its architecture, and for its antiquity; some part of it is thought to have been a heathen temple. There are a town-hall and a theatre. The population of Langres in 1831 was 5960 for the town, or 7460 for the whole commune; in 1836 it was 7677 for the commune. The chief manufactures are cutlery, especially scissars, leather, and earthenware; there are many breweries. The inhabitants trade in millstones, skins, grain, flax, hemp, wool, &c. There are eight yearly fairs. There are two seminaries for the priesthood, a high-school, a drawing-school, and lectures on mechanics and geometry applied to the arts. The public library consists of 30,000 volumes. There are a foundling and two other hospitals.

This city is commonly reputed to be the birth-place of Julius Sabinus, who assumed the purple against Vespasian, and was concealed for nine years after his defeat by the faithful affection of his wife Epponina. (Tacit., *Hist.*, iv. 67.) It was also the birth-place of Diderot.

LANGTOFT, PETER, an English chronicler who lived at the end of the thirteenth and beginning of the fourteenth century, was a canon-regular of the order of St. Austin at Bridlington in Yorkshire. He translated from the Latin into French verse Herbert Bosenham's (or Boscam's) 'Life of Thomas à Becket,' and compiled, likewise in French verse, a 'Chronicle of England,' manuscripts of which are preserved in the Cottonian Collection, Julius A.V., in the old Royal Library at the British Museum, and among the Arundel manuscripts in the library of Heralds' College. The 'Chronicle' begins with the fable of the Trojans, and comes down to the end of the reign of Edward I. Langtoft is believed to have died early in the reign of Edward II. Robert de Brunne gave an English metrical version of Langtoft, which was edited at Oxford, in 2 vols. 8vo., by Hearne, in 1725. (Hearne's *Pref.* to *Peter Langtoft;* Tanner, *Bibl. Brit. Hib.*; Chalmers, *Biog. Dict.*, xix., p. 526.)

LANGTON, STEPHEN, was a native of England, having been born in the earlier half of the twelfth century, according to one account in Lincolnshire, according to another in Devonshire. After finishing his studies at the university of Paris, he taught with applause in that seminary, and gradually rose to the office of its chancellor. He held this rank, and had also obtained some preferment in the church of his native country, when he visited Rome, about the year 1206, on the invitation of Pope Innocent III., who immediately honoured him with the purple by the title of Cardinal of St. Chrysogonus, and soon after recommended him to be elected to the Archbishopric of Canterbury, then considered as vacant by the rejection of the claims both of Reginald the sub-prior of Christ-church, whom his brother monks had in the first instance appointed to succeed the last archbishop Hubert, and of John de Gray, bishop of Norwich, whom they had afterwards substituted in deference to the commands of King John. Langton was elected by a few of the monks who were then at Rome, and was consecrated by Innocent at Viterbo, 17th June, 1207. John's determined resistance to this nomination gave rise to the contest between him and the pontiff which had such important results. [INNOCENT III.; JOHN, King of England.] The consequence, in so far as Langton was concerned, was, that he was kept out of his see for about six years; till at last, after the negociation concluded by the legate Pandulf, John and the cardinal met at Winchester, in July, 1213, and the latter was fully acknowledged as archbishop. In the close union however that now followed between John and Innocent, Langton, finding his own interests and those of the clergy in general, in so far as they were opposed to those of the king, disregarded by the pope, was naturally driven into confederacy with the insurgent barons, among whom the eminence of his station and the ascendency of his talents soon acquired him a high influence, and in whose counsels he took a prominent part. It was he who, at the meeting of the heads of the revolt at London, 25th August, 1213, suggested the demand for a renewal of the Charter of Henry I. To the cause of the national liberties, which he had thus joined, he adhered without swerving throughout the rest of the contest; a course by which he so greatly offended the pope, that on his refusal to excommunicate the opponents of the royal authority, after John's perfidious attempt to release himself from his engagements at Runnymede, he was in the latter part of the year 1215 suspended by Innocent from the exercise of his archiepiscopal functions. After this the name of Cardinal Langton is little mentioned by the historians: but he continued to preside over the church till his death, 9th July, 1228. He was a person of considerable learning, and is the author of various theological tracts, some of which have been printed, and lists of all of which that are known are given by Cave and Tanner. It has been shown in a note to the last edition of Warton's 'History of English Poetry' (ii. 80), that there is no reason to suppose Langton to have been the author of a drama in the French language, which had been assigned to him by M. de la Rue (in the *Archæologia*, vol. xiv.), on no better grounds than the manuscript having been found bound up with one of the cardinal's sermons.

LANGUAGE. The purpose of the following remarks is to show generally what language is, and to point out the principles according to which particular languages should be studied and compared. All languages may be viewed simply as existing phænomena, without any reference to the changes which they have undergone. The history of such changes is a part of the history of man, and is necessary for a full and complete understanding of any given language; but a language, considered in any stage of its development and progress, is in its essentials as language one and the same phænomenon. The origin of language, like that of man himself, is unknown, beyond the brief statement given in the book of *Genesis*. That man has the faculty of speech, is only another mode of saying that by his organization he is qualified to produce all the sounds which compose spoken language. Whether man, being originally endowed with this power, gradually formed language, stimulated by his instincts for social life, and guided by his intellectual powers; or whether language, and not the bare faculty of speech, was conferred on him by the same power which called him into being, are questions that cannot be answered, and for our present inquiry they are unimportant. If any conclusion can be drawn from the narrative of the creation in the sacred Scriptures, it is in favour of the hypothesis that language was given to man; a conclusion which even those who deny the truth of the Mosaic account must admit to contain the only satisfactory solution of the difficulty that has yet been proposed. The supposition that language was gradually formed by the efforts of man may be put side by side with the notion that man was originally a solitary savage animal, that society was formed by his perception of the advantages of union, and that thus barbarism was gradually exchanged for civilization. If this latter hypothesis is justly rejected as not only unsupported by any evidence, but as contrary to the recorded experience of mankind, the former hypothesis,

that of man constructing language*, if it does not necessarily fall with it, must at least be greatly shaken.

It is no objection to the opinion, not here expressed, but only intimated, that the history of many languages shows a gradual progress from rude beginnings to a more perfect state, and that so far back as we can trace most cultivated tongues, they bear the impress of a ruder state than that exhibited at any subsequent stage in their development, and that the social state of which they are the index and the exposition has had a progress of improvement corresponding to that of the language. Without fully admitting all that is contained in such objection, we may reply, that we know little of any language before the time when it was committed to writing, and that we know nothing of the remoter origin of any language, there being no one of which we can affirm that it is either unconnected with every other existing language, or unconnected with some language no longer known.

A definition, or rather a description, of what language is, may be required at the outset of these remarks: that which we shall give does not aim at such a degree of accuracy as to be above criticism; it is merely such a description as will show what it is that we are speaking about; and perhaps there would be no great impropriety in leaving it undefined, and allowing each person to collect his definition from what is here said.

Language consists of vocal sounds [LARYNX], which convey to the hearer the same conceptions as those which prompt the speaker to utter the sounds. Any sounds then are a component part of language which produce in the hearer the counterpart of that mental state of which these sounds are the material and sensible signs. But language, as it exists, presents great varieties, and though all languages have many sounds in common, which are universally significant and intelligible, the greatest part of the sounds composing any given language are only intelligible to those who from their early youth and long experience have become familiar with them. But this fact does not affect the definition of language. If any two human beings can by vocal sounds mutually convey to each other their desires, thoughts, and conceptions, this possession of a common power and capacity constitutes the possession of a common language. When this power and capacity are common to a considerable number of persons living in a community, the exercise of them constitutes and makes a language. Whether the vocal sounds employed are many or few, or whether the language is rude or cultivated, makes no difference for the purposes of this general description.

A language then must be viewed as the totality of the vocal sounds by which the members of any given society communicate to one another their inward conceptions. As action or motion of the body and all its parts, and the application of the bodily powers to various purposes and ends, are the signs and expression of the sensations and of the will, the result, as it were, of the moving power within, so language, which is itself in its material character nothing more than a corporeal act, is another mode of signifying and expressing the same things. But language is the expression (whether perfectly or imperfectly, is nothing to the general truth of the proposition) of our intellectual and judging faculties also; and its *form* is therefore necessarily subordinate to the laws of the human mind.

Thus language can do more than other corporeal acts: *they* can only express desire, will, purpose, design, but they cannot express many of those things which only exist as conceptions of the mind, or are only modes and forms in which the mind, according to its laws, views things and the relations of things. Language therefore, in addition to its power of expressing what can be expressed by other corporeal signs, has a peculiar power of conveying from one person to another notions, as conceived by the mind, which have no actual existence, or which at least can only be mentally conceived to exist. The degree in which language is capable of doing this depends on the mental cultivation which the people using it have had: for without such cultivation language is not wanted for the expression of many notions, and unless preceded by, or accompanied by, such cultivation, such part of language cannot exist. The language of many nations may be so poor in sounds and the combinations of sounds, as to convey very little more from one person to another than can be conveyed by other corporeal signs; or a very few sounds and combinations of sounds, aided by the other natural signs, may be sufficient for all the purposes of social existence. But even in the poorest languages many names of things, that is, general or universal terms, are required to express the meaning of a speaker when the objects referred to are not present, and probably there is no language which does not contain a considerable number of abstract terms, indicating not only things and qualities which are the objects of a sensuous intuition, but also those which are the objects of a non-sensuous intuition. Every language also, however poor, must, as far as its powers extend, express the mode in which the mind views or contemplates things and the relations of things; and the form therefore of every language is necessarily subordinate to the laws of the human mind, by which we mean that the choice of the vocal sounds intended to express any distinct meaning must have respect to the notions which the speaker intends to convey, and their arrangement must have a settled conformity to the order and sequence, as among themselves, of such notions, or in other words, their mutual relations.

The matter then of which language consists is vocal sounds: the form which it assumes is the relation of those sounds to one another, which is expressed (within certain limits) chiefly by their arrangement with respect to one another. In order that the several sounds may convey the same meaning, the same sounds must be used for the same purposes, that is, the meaning of any single sound must, generally speaking, at least for any given epoch, be fixed. It is no less necessary that the arrangement of the vocal sounds should be tolerably well fixed, in order that the same set of sounds may convey the same meaning; for as the number of permutations of a small number of sounds is very great, there could be no certainty in the meaning of any considerable number of sounds, when used in connection for the purpose of conveying a speaker's meaning, unless the speaker used not only sounds familiar to the hearer, but also arranged them in an order such as the hearer himself would arrange them in, if he were to attempt to express the meaning which the speaker intends to convey.

Even in many of the simplest sentences, consisting only of two or three words, every or nearly every language has a definite order for expressing one meaning by such words, and another order for them when they are to express a different meaning. Frequently, instead of a change in the order of the sounds, the difference of meaning may be conveyed by the greater or less stress laid on a particular sound, or by some change in the intonation of voice, which is in effect a change in the sounds, and therefore all that is necessary to mark a difference. This power, which spoken language possesses, gives it one advantage over written language, in the use of which we are sometimes obliged to use supplementary signs or marks to express what the voice can more surely effect.

If we come to analyze the vocal sounds of a language, we can separate them with no great difficulty into two chief classes, just as we resolve the whole meaning conveyed by them into a variety of objects or notions suggested by the sounds, and into a number of relations among these objects or notions, which are also suggested by the sounds; for no set of words can convey a meaning without suggesting to the mind two objects or notions at least, and a relation between them.

Thus the sounds of a language, viewed as an existing phænomenon, may be divided into two great classes: sounds which of themselves convey a notion, and may therefore be called *notional*, such as 'man,' 'horse,' 'virtue,' 'vice,' 'come,' 'walk;' and sounds which of themselves express no notion, but only serve to connect notional words and to indicate the relation between and among them, and may therefore be called *relational*, such as 'from,' 'to,' 'who,' 'which.' It is true that many of these relational words, perhaps all of them, may once have been notional, and also that their precise meaning and value, in the case of languages no longer spoken, can only be determined by tracing them to their origin, or to such source as we are compelled by want of other evidence to consider as their origin; but this, though it may be true, is no objection to our statement of what a language consists as an actual phænomenon. The actual meaning of all the words which compose a language must be determined by their actual use. Their former meaning and their history must be determined by a reference to the language as formerly used, the evidence of which use is the written form of language.

The examination of the various modes of recording language, or of the representations or marks by the aid of which sounds can be at any time reproduced equivalent in mean-

* 'The meaning of Language is derived from Compact.'—Harris's *Hermes*, 314.

'ng to those by which the writer would have orally expressed what he has expressed by signs or marks on paper or any other durable substance, belongs to the subject of writing. [WRITING.] It will be sufficient at present to observe that the mode in which the sounds of any given language are represented must not be considered as necessarily indicating anything peculiar in the language itself.

It would seem probable that the character of any language now existing must have been permanently and to a considerable degree affected by the circumstance of the state or condition in which it was when it was first reduced to writing. Whether we suppose all words to have been originally notional or not, it is difficult to conceive any words as first used otherwise than as monosyllabic sounds; at least, so far back as we can trace any known language, such seems to be the result to which we approximate. By this it is not meant to say that a syllable is one simple sound, but that the monosyllabic sounds here meant are such as in their integrity expressed one notion distinctly and one only, that every part of the sound was a necessary part of the meaning, and that no part of the sound was derived from the union of another sound with it. Thus the whole of a language would consist of vocal sounds, every one of which had its distinct meaning in itself.* But spoken language is in its nature favourable to the agglutination of sounds, and particularly of those which come into juxtaposition in such a way as to readily unite without thereby obscuring the meaning of what is said. Thus, to adopt for the purpose of convenience the names now used, the verb and its pronoun, the word signifying a place and the word expressing some relation to that place, and other similarly situated words, would respectively form combinations, and thus would arise the phænomenon, which we observe in most languages, of words reducible to various elements, some of which in their simplest form are notional terms, and some which, taken by themselves, convey no meaning at all, but by virtue of their union with the notional term modify and qualify it.

As this agglutination owes its existence mainly, as we think, to the use of spoken language, we should expect to find that unwritten languages present these phænomena of agglutination and aggregation of elemental sounds, as well as written languages. And such is the fact. Some of the Indian languages of North America, for instance, are exceedingly rich in all such words as are formed by this process of agglutination. When a language has by writing obtained a considerable degree of fixedness, this process is stopped, and all that then takes place in the way of producing new forms of words is by compounding actually existing words, which are in fact and appear as unions of distinct words, yet so that each part of the word retains its distinctive character.

If the language of a nation were committed to writing in a very early state of its progress, it seems probable that the simple elementary forms would be kept much more distinct than in languages which have not been committed to writing except in a more mature form. Thus the mass of the words would be of the monosyllabic class, and the adoption of distinct symbols for the representation of each sound would seem natural and almost necessary. It must have been in the attempt to represent in writing some of the languages which had been cultivated by longer use and improved by social and intellectual development that the discovery of the mode of representing all the sounds of a language by an alphabet originated.

It only remains to observe that some languages, as the Greek and the Latin, and, to a considerable extent, the German, express many relations between the various notions contained in any set of words, by means of certain variations in the forms of the words themselves, which variations mainly occur in the terminations of such words. Thus the whole meaning intended to be expressed by the words 'Homo bovem ferit,' may be indicated by any arrangement of these three words. It is true that in the Latin and Greek, and indeed in all languages in which the terminations of words are capable of expressing relations, it is by no means unimportant in what order we place the words, notwithstanding the general meaning can be conveyed by almost any order. The particular and special meaning can only be conveyed by adopting that arrangement which shall express the order in which the several ideas, as suited to the particular occasion, rise up in the mind of the speaker.

* This is nearly the same as Aristotle's definition of a Word.

Some languages, of which the English in its present form is a striking example, have little or no power of expressing the relation of ideas by any change in the terminations of words; and accordingly they express notions by one set of terms, and relations by another set of words. Such languages are necessarily more limited as to the power of varying the order of their words than languages of the class above referred to. The English language, for example, is now brought pretty nearly into that form in which we may conceive language to have originally existed; with this exception, that language as originally existing, so far as we are capable of conceiving it in that form, consisted altogether of notional words, some of which were also used in a subordinate sense as relational words. The English language, after losing much of its original stock of inflections and terminations, is now fixed by writing in this primitive form; but if by any accident it should in any country exist only as a spoken language for some time, and should in such country be reduced to writing in the form in which it is spoken, it is easy to conceive that the process of agglutination and aggregation above referred to might produce a language of a character very different from that now in use.

That part of language which treats of single words and their varieties of form in the way of inflection is called Etymology, and is one of the divisions of grammar. Etymology also comprehends the notion of historically tracing the successive forms which the words of a language have had, of separating them into their elementary parts, and then comparing the words, thus reduced to their simplest forms, with the corresponding words and forms in languages known to be related, or in order to establish the relationship, that is, the ultimate identity or unity of words in the languages compared.

That part of language which treats of the arrangement of the words composing a sentence, and of the modifications in form or termination to which such words are subjected in consequence of entering into that combination which constitutes a sentence, is generally called Syntax. The syntax of every language is a subject requiring a special investigation and exposition, as well as its etymology; but as etymology has its general principles, so has syntax. These general principles are contained in logic and rhetoric, but their proper application to the syntax of any particular language has not, so far as we know, been yet satisfactorily exhibited.

That division of grammar which is called Etymology has been disgraced by such puerile trifling, and has been pursued with such an utter disregard to anything like scientific principles, as to create in the minds of many persons a suspicion against every thing presented to their notice under the name of etymology. Such persons have viewed etymology as nothing else than a dextrous play upon words, and have looked upon etymologists as little better than indifferent punsters. That the generality of writers upon this subject scarcely deserve any better appellation, will hardly be denied by any one who has studied etymology upon true philological principles; and if any doubt were entertained upon the point, it would only be necessary to refer to such works as Damm's 'Homeric Lexicon,' and Lennep's 'Etymology of the Greek Language,' which are full of such wild conjectures and such extravagant etymologies, that we cannot be surprised that a study which produced such results should have been considered as ridiculous and absurd. But within the last twenty or thirty years the study of etymology has been pursued on sound principles and with corresponding success; and the various and apparently capricious sounds of language have been shown to be governed by laws, within limits as strict and invariable as those to which matter in general is subjected. This improvement has been owing in a great measure to the comparison of many languages with each other, instead of confining the field of observation to one or at the most two or three tongues. Nothing has perhaps contributed to this improvement more than the discovery of Sanskrit (for, as it has been justly observed, it may properly be called a discovery), which was found to bear such a striking resemblance both in its more important words and in its grammatical forms to the Latin and Greek, the Teutonic and Slavonic languages, as to lead to the conclusion that all must have been derived from a common source. The great similarity of all these languages, and their contrast to the Hebrew, Arabic, and other Semitic tongues, has led to the use of the term 'affinity of languages,' by which is meant that all those languages which employ the same sounds to express the most simple ideas and adopt

the same mode of grammatical inflexion, must originally have been one and the same language, or derived from some common language. We cannot well suppose that languages which resemble one another in these respects have been derived from any one of those now existing in which these resemblances are obvious: for if we could imagine the Latin to be descended from the Greek, how should we account for the similarity of the Latin and Greek to the Sanskrit and Teutonic tongues? The little intercourse that subsisted between the inhabitants of India and the Western nations precludes the supposition that one nation could have derived its language from the other; and indeed the resemblance is so striking, and descends to such minute particulars, that nothing but a common origin is sufficient to account for their similarity. The error we have been attempting to combat is very general, and nothing is more common than to hear a certain class of etymologists speak of a number of English words as derived from the Latin and Greek, which are in fact the common property of many tongues. Many English words, such as *inspect*, *corporate*, *communicate*, *detriment*, are doubtless derived from the Latin, while others, such as *astronomy*, *geography*, *geology*, have been borrowed directly from the Greek, or manufactured according to settled analogies; but such words as *know*, *lick*, *break*, *yoke*, *sit*, and numerous others, are common to the English, Sanskrit, Latin, Greek, and Slavonic tongues; and it might be said, with as much truth, that the Sanskrit *jnā*, or the Greek *γι-γνώ-σκω*, are derived from the English, as that the English word comes from the Latin.

In examining cognate languages, and particularly that class of which we have been speaking, it is necessary to attend in the outset to two points: first, care should be exercised, in the comparison of words, not to allow any letter or letters which are no essential part of the root to be adduced as proof of similarity, but in every case to discard these letters, whether they are prefixed or suffixed to the root, before any opinion is formed with respect to the identity or dissimilarity of the words. Secondly, a knowledge should be acquired of the letters which are interchangeable in each language; for, without such a knowledge, the greater number of resemblances would necessarily escape our notice. The identity of many words which seem at first sight to have but a very slight resemblance in sound is fully established by an acquaintance with the regular transformation of letters that occurs between the different languages.

In the Sanskrit, Greek, Latin, and cognate tongues, the different cases of nouns and adjectives, and the different tenses and persons of verbs, are formed by means of affixes: thus the nominative singular of masculine and feminine nouns is usually formed by adding *s*, and the accusative by adding *m*, with or without a short vowel prefixed. Thus in the Latin nominatives *cani-s*, *lupu-s*, *legatu-s*, *equu-s*, and in the accusatives *cani m*, *lupu-m*, *legatu-m*, *equu-m*, the *s* and the *m* are no essential parts of the words, but are only added to mark the cases. It would therefore be necessary, if we wished to compare these words with any other words in one or more of the cognate languages, to look at the form of the word unaffected by case-endings, namely, *cani*, *lupu*, *legatu*, or *equu*, or more properly *lupo*, *legato*, *equo*, since the nominative and accusative singular of Latin nouns of the second declension originally ended in *o,s* and *o,m*. If we look at the verb, we see that the past imperfect of an active verb always ends in the first person in *eba-m* or *ba-m*, the *m* being the sign of the person or pronoun 'I,' and the *eba* or *ba* marking the tense. Thus *reg-eba-m*, *ama-ba-m*, *mone-ba-m*, *audi-eba-m*, would become *reg*, *ama*, *mone*, and *audi*, after the sign of the person and tense had been removed; and if the characteristic of each tense be removed, the essential part of the verb will always remain the same. This essential part of the verb and noun separated from the characteristic letters which mark the cases, numbers, tenses, and persons, has been sometimes called, for want of a better name, the crude form of a noun or verb; and every word should always be reduced to this state before it is compared with another word in one of the cognate tongues for the purpose of proving the identity or dissimilarity of the two. But after we have reduced the word to its crude form, we must frequently proceed a step further before we venture to compare it with another word in a different language. The majority of words in the Latin and cognate languages are derived from monosyllabic roots by affixing various terminations to qualify the meanings of the roots to which they are attached, and to fit them for a new and different use. [AFFIX.] It is therefore necessary to discover what is the root of a word, in order to compare it with a corresponding root in a different language; since it will frequently happen that two languages which have the same root in common always make use of it with different affixes to mark nouns, verbs, adjectives, &c.; and it is therefore impossible to compare the two roots before the terminations are removed. Several words, especially verbs which express the most simple notions, frequently contain the root without any termination affixed, except the letters to mark inflection, as *ut-i*, *fer-re*, *ed-ere*, *bib-ere*, *cad-ere*, &c.; and even when terminations are added to the root to form adjectives, verbs, nouns, &c., there is seldom any difficulty in discovering the root, in consequence of the regularity of structure of the Latin, Greek, and cognate tongues. Thus, if it were necessary to discover the root of *utili-s*, it would only be necessary, after separating the *s* of the nominative case, to compare it with such words as *fac-ili-s*, *fut-ili-s*, *sut-ili-s*, *sim-ili-s*, *ag-ili-s*, *doc-ili-s*, &c.; and it would be evident from analogy that the root must be *ut*, even if we did not know the existence of *ut-i* and *us-u-s*. On the same principles we should have no hesitation in asserting that *sig* is the root of *sig nu-m*, by comparing it with *tig-nu-m*, *reg-nu-m*, *lig-nu-m*; that *mad* is the root of *mad-idu-s*, by comparing it with *viv idu-s*, *rap-idu-s*, *tim-idu-s*, *tab-idu s*, &c.; that *frag* is the root of *frag-men*, by comparing it with *nu-men*, *flu-men*, *gra-men*, *sta-men*, *teg-men*, &c.; that *mar* is the root of *mar-inu-s*, by comparing it with *vic-inu-s*, *taur-inu s*, *sup-inu-s**; even if we had no other proof of such being the case. But since the same root frequently occurs in several words in the same language, it is only necessary in such cases to compare these words with one another, in order to see what letters are common to all these words, and to separate those which are not found in each instance, in order to ascertain the root. Thus in the words *cap*-ere, *cap*-tus, *cap*-tivus, de-*cip*-ere, re-*cip*-ere, con-*cep*-tus, re-*cup*-era-re, the letters *cap*, *cip*, *cep*, or *cup*, always occur, and may therefore be regarded as the root.

It not unfrequently happens that a word is derived from another word, which is itself a derivative from the root. Thus the adverb *audacter* is derived from the adjective *audac* by affixing *ter*, in the same manner as *sapient-er* is formed from *sapient*, while *aud-ac* itself is derived from the root *aud* (which we have in *aud-ē-re*), as *fer-ac* from *fer*. Sometimes a word must be traced through three or four different terminations, in order to arrive at the root. Thus *equitatu-s* comes from the verb *equita-re* (crude form, *equita*); *equita* is derived from *equit* or *equet*, a 'horseman,' and *equit* from the root *equ*, which we have in *equo*.

The meaning of the root is not only affected by the terminations which are affixed to it, but also by words prefixed to it. We are familiar with this in our own language, as in the words *un-able*, *un fore-seen*, *be-calm*, *be-come*, &c. So in Latin, in *re prim-ere*, *prim* is the root with *re* prefixed; in *con-duc-ere*, *duc* is the root with *con* prefixed. The root of the following Latin words will, after the preceding remarks, be easily recognised:—inter-*nec*-ion-em; com-*min*-us; *vir*-tut-e; *mag* n-itudin-is; in-*op*-ia; *vic*-tu-s; trans-*mar*-inu-m; *cæl*-itus; pro-*ced*-ere; *leg*-a-to-s; con-*tig*-it; *fru*(*g*)-mentu-m; con-*spec*-tu-s; pro-*hib*-e-at; co-*gno*-sc-o; con-*fec*-to; oc-*cul*-ta-v-it; con-*tin*-ent-es; im-*ped*-i-mentu-m; ex-*ped*-i-to-s; *leg*-ion-um; re-*liqu*-it; *ve*-ini-tat-ibus.

The advantage of analyzing words in this manner is not confined to the comparison of roots in different languages; it will be found of great use in explaining the forms of a language, without reference to any other, and will prove that the real roots of a language are comparatively few. It will also greatly abridge the labour of learning a language; since, after the original signification of the root has been acquired, the meaning of almost all the words which contain the same root can generally be ascertained, even though the learner may never have seen these individual words. A few examples from the Latin language will show with what regularity words are formed from the same root: thus from the root *ar*, 'plough,' we have *ar*-o (*ar*-a-o) *ar*-a-tu-s, *ar*-a-tio,

* Some of these examples and many of the above remarks have been taken from an appendix to an introductory lecture delivered at the University of London, 'On the Study of the Latin and Greek Languages,' by Professor Long, in which the reader will find many excellent observations on the importance and advantage of this method of studying language.

ar-a-tor, *ar*-a-tru-m; from the root *ag* we have *ac*-tu-s, *ac*-tio, *ac*-tor, *ag*-men, *ag*-ili-s, *ac*-turu-s; from the root *fac* we have *fac*-io, *fac*-tu-s, *fac*-tio, *fac*-tor, *fac*-ili-s, *fac*-turu-s, ædi-*fic*-iu-m; from *ac*, signifying a point, we have *ac*-u-s, *ac*-ie-s, *ac*-u-o, *ac*-u-tu-s, *ac*-idu-s, *ac*-etu-m, *ac*-ri-s; from *pac* (to fasten, to arrange, to fit) we have *pac*-s, *pa*(n)*g*-o, *pac*-tu-m, *pac*-tio, *pac*-isc-or, *pac*-o, *pac*-a-tor, *pac*-a-bili-s, com-*pag*-e-s. In the same manner from the root *spec* or *spic*, signifying 'to see,' we have *spec*-i-o (used by Varro), *spec*-i-e-s, *spec*-i-ali-s, *spec*-i-osu-s, *spec*-i-men, *spec*-to, *spec*-ta-tu-s, *spec*-ta-tio, *spec*-ta-tor, *spec*-ta-tric-s, *spec*-ta-bili-s, *spec*-ta-culu-m, *spec*-ta-men, *spec*-tio, *spec*-tru-m, *spec*-ula, *spec*-ul-or (*spec*-ula-or), *spec*-ula-tor, *spec*-ula-tric-s, *spec*-ula-tor-iu-s, *spec*-ula-tus, *spec*-ula-bili-s, *spec*-ulu-m, *spec*-ula-ri-s; con-*spic*-i-o, con-*spec*-tu-s; con-*spic*-or (con-*spic*-a-or), con-*spic*-uu-s; in-*spic*-i-o, in-*spec*-tor, in-*spec*-tio, in-*spec*-t-o (in-*spec*-ta-o), in-*spec*-ta-tio; re-*spic*-i-o; re-*spec*-tu-s, re-*spec*-t-o (re-*spec*-ta-o), and many more.

In the above examination we have confined our attention to one language; but the same remarks would apply with equal force to the formation of the kindred languages. It could easily be shown by numerous examples from the Greek and Sanskrit that the different tenses of verbs and cases of nouns in these languages can be stripped of their inflection letters, and thus reduced to their crude forms; and that these crude forms, if they contain any terminations, can easily be reduced to their roots, as in the Latin language. It might also be shown that the vast majority of words in the cognate tongues are built up from roots by means of affixes or suffixes, with the same regularity of structure as we find in the Latin language.

The necessity of an acquaintance with the regular transformations of letters that occur between cognate languages has been already remarked. In fact, it is impossible to compare one language with another without a knowledge of the principal changes of the letters. Thus the German *herz* might be supposed to have little in common with the Latin *cor*, *cord-is* (crude form, *cord*), except the meaning; but the identity of the two words is established at once when it is known that *c* in Latin is almost invariably *h* in the Teutonic languages, as *coll-um*, *hal-s*; *cel-a-re*, *hehl-en*; *cut-i-s*, *haut*; *corn-u*, *horn*; *cannabi-s*, *hanf* (*hemp*); *caput*, *haupt* (*head*), &c.; and that the Latin *d* frequently corresponds to the Teutonic *z*, as *den-s* (*dent*) *zahn*; *duc-ere*, *zieh-en*; *dec-em*, *zeh-en*, or *zeh-n*, &c.

The Sanskrit word for 'ten,' *dasa*, and the German *zeh-en*, or *zeh-n*, have not one letter in common; but no doubt can be entertained respecting their identity when it is shown that the *d* in Sanskrit constantly corresponds to *z* in German, and that the palatal *s* of the Sanskrit corresponds to the German *h*. The following table, taken from Pott's 'Etymologische Forschungen' (pp. 82, 83), contains a list of the principal transformations of letters in some of the Indo-Germanic languages. The reader who desires further information on this subject can consult the articles under the letters of the alphabet in this work, in which will be found examples of many of the changes in the following table, and also a list of the transformations that occur between the English, German, and other Indo-Germanic languages, which are not included in the list below. This table is chiefly formed for the purpose of comparing the transformation of the Sanskrit letters with those of the cognate tongues; the arrangement of the Sanskrit alphabet has accordingly been adopted in drawing up the list.

	Sanskrit.	Greek.	Latin.	Lithuanian.	Gothic.	Old High German
Gutturals.	k	κ, π	c (qu)	k, *Lettic* k and z	h, g	h, g
	(ksh)	ξ, σσ, κτ κ, (π)	x (c-s), c, s	kss, k, ss (pronounced sh) *Lettic* z	hs, h, g	
	kh	χ, κ				
	g	γ, β	g, b	*Lettic* g	k	ch
	gh	χ				
	n (guttural)	γ (nasal)	n (guttural)			
Palatals.	ch	π, τ	c (qu)	cz (pronounced ch) k; *Lettic* chh, z, k	f	v
	chh	σχ	sc, c		sk	sk
	j	γ (β, ζ ?)	g	g; *Lettic* ds	k	ch
	jh					
	n (palatal)	Different nasal letters	n (guttural)			
Dentals.	t	τ, σ	t, s	t	th	d (t)
	th	τ	t	t	th (t)	
	d	δ, θ	d, l	d	t (d)	z (pronounced ts)
	dh	θ, σ	f, d	d	d	t
	n	ν, λ	n, l	n (m)	n	n
Labials.	p	π, φ	p, c (qu)	p	f	v
	ph					
	b	β, π	b			
	bh	φ (β)	f, b	b	b	p
	m	μ, (β before liquids)	m	m	m	m
Semi-vowels.	y (palatal)	ι, ε, ζ, aspirate	j, i	y	y	y
	r (lingual)	ρ, λ	r, l	r, l	r, l	r, l
	l (dental)	λ	l	l	l	l
	w, v, (labial)	Ϝ, υ, ε, β, φ, aspirate	v	w	v	w
Sibilants.	s (palatal)	κ, σ, aspirate	c (qu), s	s, ss, sz, k	h, s	h, s
	sh (lingual)	σ, aspirate	s, r	sz (pronounced sh)	s	s, r
	s (dental)	σ, aspirate, ρ	s, r	s	s, z	s, r
	h (guttural)	χ, γ, κ	h, g, c	z (pronounced as French j), sz, g	h, g	k

That languages spoken by different nations, and at present mutually unintelligible to the people of each nation, may nevertheless be so closely allied to each other in their grammatical forms, and in the words used to express the most common objects, actions, and relations, as to prove that they are kindred languages, and proceed from one common origin, will scarcely be denied by any one who has studied some of the principal languages which belong either to the Indo-Germanic or Semitic branches. It is proposed in the following remarks to show the affinity of languages by examples drawn from Indo-Germanic tongues; partly because some of these languages are familiar to most of us, and partly because they are more in number and have been studied with greater accuracy than the Semitic tongues.

The family of Indo-Germanic languages may be divided into six branches, two of which belong to Asia, and four

to Europe, and through European colonies to other parts of the world.*

1. The Indian branch, comprising the Sanskrit and its derivative dialects.

2. The Medo-Persic, or Arian branch; at the head of which stands the Zend. The other antient languages of the country, the Pehlvi and the Deri, and also the modern Persian, belong to this division.

3. The Teutonic branch, with the Gothic at its head, and comprising the different German dialects, the Anglo-Saxon, the Icelandic, the Swedish, Danish, &c.

4. The Græco-Latin branch, comprising the two antient classical languages.

5. The Slavonic branch may be divided into three divisions; the first comprises the Lithuanian, with the antient Prussian and Lettic; at the head of the second stands the Russian; the third comprehends the Polish and Bohemian, and the languages of the Slowaks in Hungary, and of the Wends and Sorbs in Lusatia and Saxony.

6. The Celtic branch may be divided into two divisions: the first comprising the Welsh, Cornish, and Armorican; the second, the Irish or Erse, the Gaelic or Highland Scotch, and the Manks. The connection of these languages with the other Indo-Germanic languages has been questioned by many etymologists; but the grammatical structure of the Welsh and Erse resembles that of the acknowledged Indo-Germanic languages in so many particulars, that we may safely pronounce them to belong to the same great family.

It is now universally admitted by those who have written best on the comparative study of languages, that the affinity of languages should above all things be established by a comparison of their mode of forming and deriving words, and the system of their inflections. 'Comparisons of detached words,' remarks Mr. Pott, 'frequently yield but a single point of coincidence, which is always liable to the suspicion of having been transferred from one language into the other; while the actual coincidences in the expression of some grammatical relation, which is not so easily transplanted, and in the roots as found by careful grammatical analysis, often present a hundred or thousand points of approximation. Even languages of the same family sometimes diverge widely, owing to the diversity of pronunciation which gradually estranges them as dialects no longer intelligible to each other. But this diversity of pronunciation, although from a higher point of view it must be considered as accidental, stands under the control of certain natural laws, especially that of the physiological affinity of sounds; and these laws we ought to discover and establish. *Kindred Languages* are those which, either in consequence of the internal development and the geographical spreading of a language, or the effect of external influences, have lost their original identity, and have become varied and manifold; while languages not akin are those which from the outset have originated under principles of formation altogether different, and have grown up conformably to those principles. If languages not akin occur in any particulars, such occurrences must be accounted for either through the intercourse of the nations to whom they belong (even if that intercourse cannot be traced in history), or by the general sameness of the human mind and senses, or of the object designated; or finally, by assuming an accidental coincidence, which is not altogether to be excluded. No small proportion of the words collected by Klaproth, in his "Asia Polyglotta," in support of his theory of an antediluvian conformity of languages, show an external similarity of sound; but this similarity vanishes, as soon as we come critically to investigate these words, and to dissect them into their component elements, conformably to the rules of their respective languages.'

In conformity with these remarks, it is proposed first to establish the affinity of the Indo-Germanic languages by a comparison of their numerals and grammatical forms, and afterwards by a copious list of words common to all or most of these languages.

The following examples have been chiefly taken from Bopp's 'Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Litthauischen, Altslawischen, Gothischen, and Deutschen;' Pott's 'Etymologische Forschungen auf dem Gebiete der Indo-Germanischen Sprachen;' Prichard's 'Eastern Origin of the Celtic Nations, proved by a comparison of their dialects with the Sanskrit, Greek, Latin, and Teutonic languages;' and from Grimm's great work on Teutonic Grammar.

Numerals.

	Sanskrit.	Zend.	Persian.	Greek.	Latin.	Lithuanian.	Russian.	Gothic.	Old High German.	Modern German.	English.	Erse.	Welsh.
1	êka	aêva	yik	ἕν	oino œno uno	wena	odin	ain	ein	ein	one an a	aen	un
2	dwi	dwa	du	δύο	duo	du	dva dvie	twa	tue	zwei	two	da do	dau´ dwy
3	tri	thri	seh	τρί	tri	tri	tri	thri	thri	drei	three	tri	tri tain
4	chatur	chatwar	chehaur	τέτταρ τέσσαρ πέσσυρ πίσυρ πίσυρ	quattuor quadra	ketrai	chetyre	fidwor	fiuuar	vier	four	keathair	pedwar pedair
5	panchan	panchan	penj	πέντε πέμπε	quinque	penki	pyat	fimf	finfe	fünf	five	kuig	pump
6	shash	cswas	shesh	ἕξ	sex	szeszi	shest	saihs	sehs	sechs	six	se	chwech
7	saptan	haptan	heft	ἑπτὰ	septem septua	septyni	sem	sibun	sibun	sieben	seven	secht	saith
8	ashtan	astan	hesht	ὀκτὼ	octo	aztuni	osm vosem	ahtau	ahto	acht	eight	ocht	wyth
9	navan	navan	nuh	ἐννέϜα	novem	devyni	devyat	niun	niguni	neun	nine	noi	naw
10	dasan	dasan	deh	δέκα	decem	deszimt	desyat	taihun	tehan	zehen zehn	ten	deich	dêg
20	vinsati	visaiti	bist	εἴκοσι εἴκοντι Ϝίκατι	viginti vinginti?	dwideszimpti	dvatzat	twaimtigum	tuentig	zwanzig	twenty	fichid	ugain
30	trinsat	thrisata	si	τριάκοντα	trigiuta tringinta?	trisdeszimpti	tritzat	threinstigum	thrittig	dreiszig	thirty	deich ar fichid	dêg ar ugain
100	satam	satem	sad	ἑκάτοντα ἑκατὸν	centum	zimta	sto	hunta	hunt	hundert	hundred	kett	cant

* This classification is taken from an excellent review of Pott's 'Etymologische Forschungen,' by the late Dr. Rosen, in No. 18 of the 'Journal of Education.'

Declension of the Demonstrative Pronoun.

		Sanskrit.			Zend.			Greek.			Latin.		
		M.	F.	N.	M.	F.	N.	M.	F.	N.	M.	F.	N.
Singular.	Nom.	sas	sâ	tat	hô	hâ	tat	ὁς, ὁ	ἁ, ἡ	τὸ	hi-c	hæ-c	ho-c
	Acc.	tam	tâm	tat	tem	tanm	tat	τὸν	τὰν, τὴν	τὸ	hun-c	han-c	ho-c
	Gen.	tasya	tasyâs	tasya	tahê	tanhâo	tahê	τοῖο	τᾶς, τῆς	τοῖο	hujus	hujus	hujus
	Dat.	tasmai	tasyai	tasmai	tahmai	tanhai	tahmai	τῷ	τᾷ, τῇ	τῷ	hui-c	hui-c	hui-c
Plural.	Nom.	tê	tâs	tâni, tâ	tê	tâo	tâ	τοὶ, οἱ	ταὶ, αἱ	τὰ	hi	hæ	hæ-c
	Acc.	tân	tâs	tâni, tâ	tan	tâo	tâ	τοὺς	τὰς	τὰ	hōs	hās	hæ-c
	Gen.	têsham	tâshâm	têsham	taêshanm	tâonhanm	taêshanm	τῶν	τάων, τῶν	τῶν	hōrum	hārum	hōrum
	Dat.	têbhyas	tâbhyas	têbhyas	taêibyô	tâbyô	taêibyô.	τοῖσι	ταῖσι	τοῖσι	hīs	hīs	hīs

		Gothic.			Lithuanian.			Old Slavonic.			Old High German.		
		M.	F.	N.	M.	F.	N.	M.	F.	N.	M.	F.	N.
Singular.	Nom.	sa	so	thata	tas	ta	tai	t'	ta	to	der	diu	daz
	Acc.	thana	tho	thata	tan	tan	tai	t'	tû	to	den	dia	daz
	Gen.	this	thizôs	this	to	tôs	to	togo	toja	togo	des	dera	des
	Dat.	thamma	thizai	thamma	tam	tai	tam	tomû	toi	tomû	demu	deru	demu
Plural.	Nom.	thai	thos	tho	tie	tos	..	ti	ty	ta	diê	dio	diu
	Acc.	thans	thos	tho	tus	tas	..	ty	ty	ta	diê	dio	diu
	Gen.	thizê	thizô	thizê	tû	tû	tû	tjech	tjech	tjech	dero	dero	dero
	Dat.	thaim	thaim	thaim	tiem(u)s	tom(u)s	tiem(u)s	tjem	tjem	tjem	dêm	dêm	dêm

Declension of the First Personal Pronoun.

		Sanskrit.	Zend.	Greek.	Latin.	Gothic.	Lithuanian.	Old Slavonic.	Old High German.	Russian.
Singular.	Nom.	aham	azĕm	ἐγών ἐγὼ	egomet ego	ik	asz	az	ih	ya
	Acc.	mâm, mâ	manm, mâ	μὲ	mē, met	mik	manen	mja	mih	menya
	Gen.	mama, mê	mana mê, môi	μοῦ	mei, mis	meina	manens	mene	mîn	menya
	Dat.	mahyam, mê	mê, môi	ἐμίν, μόι	mihi	mis	man	mnje, mi	mir	mno
Plural.	Nom.	vayam asmê	vaêm	ἄμμες, ἡμεῖς	nos	veis	mes	my	wîr	mi
	Acc.	asmân nas	nô	ἄμμε, ἡμᾶς	nos	unsis	mus	ny	unsih	nas
	Gen.	asmâkam nas	ahmâkĕm nô	ἀμμέων, ἡμῶν	nostri nostrum	unsara	musû	nas	unsar	nas
	Dat.	asmabhyam nas	nô	ἄμμι(ν) ἡμῖν	nobis	unsis	mumus	nam	uns	nam

Declension of the Second Personal Pronoun.

		Sanskrit.	Zend.	Greek.	Latin.	Gothic.	Lithuanian.	Old Slavonic.	Old High German.	Russian.
Singular.	Nom.	twam	tûm	τούν, τὺ	tu	thu	tu	ty	dû	tii
	Acc.	twâm, twâ	thwanm thwâ	τὲ	te	thuk	tawen	tja	dih	tebya
	Gen.	tava, twê, tê	tava thwôi, tê, tôi	τεῦ	tui, tis	theina	tawens	tebe	dîn	tebya
	Dat.	tubhyam, thwê, tê	thwôi, tê, tôi	τεΐν, τοί	tibi	thus	taw	tebje, ti	dir	tebe
Plural.	Nom.	yûyam, yushmê	yûshĕm, yûs	ὔμμες ὑμεῖς	vos	yus	jûs	vy	îr	vü
	Acc.	yushmân, vas	vô	ὔμμε ὑμᾶς	vos	izvis	jus	vy	iwih	vas
	Gen.	yushmâkam vas	yûsmâkĕm vô	ὑμμέων ὑμῶν	vestri vestrum	izvara	jusû	vas	iwar	vas
	Dat.	yushmabhyam vas	yûsmaêibya	ὔμμι(ν) ὑμῖν	vobis	izvis	jumus	vam	iu	vam

Nominative Singular of Nouns.

	Sanskrit.	Zend.	Greek.	Latin.	Lithuanian.	Gothic.
m.	(vrĭka) vrĭka-s (wolf)	vĕhrkô (wolf)	λύκο-ς	lupu-s	wilka-s (wolf)	vulf'-s * (wolf)
n.	(dâna) dâna-m (gift)	dâte-m (given)	δῶρο-ν	donu-m	géra (good)	daur' (door)
f.	(jihvâ) jihvâ (tongue)	hizva (tongue)	χώρα	terra	rankà (hand)	giba (gift)
m.	(pati) pati-s (master)	paiti-s (master)	πόσι-ς	hosti-s	pati-s (master)	gast'-s (guest)
f.	(prîti) prîti-s (love)	âfrîti-s (blessing)	πόρτι-ς	siti-s	awi-s (sheep)	anst'-s (mercy)
n.	(vâri) vâri (water)	vairi (water)	ἴδρι	mare	...	
m.	(sûnu) sûnu-s (son)	pasu-s (beast)	ἰχθύ-ς	portu-s	sunû-s (son)	sunu-s (son)
f.	(tanu) tanu-s (body)	tanu-s (body)	πίτυ-ς	socru-s	...	handu-s (hand)
n.	(madhu) madhu (wine)	madhu (wine)	μέθυ	pecu	darkû (ugly)	faihu (beast)
m. f.	(gô) gau-s (cow, ox)	gâu-s (cow, ox)	βοῦ-ς	bô-s		
f.	(nau) nau-s (ship)	...	ναῦ-ς	nav(i)-s		
f.	(vâch) vâk (speech)	vâk-s (speech)	Fὄπ-ς	voc-s		
m.	(bharat) bharan (bearing)	baran-s (bearing)	φέρων	feren-s	sukan-s (turning)	fijand-s (enemy)
m.	(âtman) âtmâ' (soul)	asma (heaven)	δαίμων	sermo'	akmu' (stone)	ahma (soul)
n.	(nâman) nâma' (name)	nâma' (name)	τάλαν	nomen	...	namô (name)
m.	(bhrâtrĭ) bhrâtâ' (brother)	brâta' (brother)	πατήρ	frater	...	brôthar (brother)
f.	(duhitrĭ) duhitâ' (daughter)	dughdha (daughter)	θυγάτηρ	mater	dukté' (daughter)	dauhtar (daughter)
m.	(dâtrĭ) dâtâ' (giver)	dâta' (giver)	δοτήρ	dator		
n.	(vachas) vachas (word)	vachô (word)	Fέπος	opus		

Accusative Singular of Nouns.

	Sanskrit.	Zend.	Greek.	Latin.	Lithuanian.	Gothic.
m.	vrĭka-m	vĕhrkĕ-m	λύκο-ν	lupu-m	wilka-n	vulf'
n.	dâna-m	dâte-m	δῶρο-ν	donu-m	géra	daur'
f.	jihvâ-m	hizva-nm	χώρα-ν	terra-m	ranka-n	giba
m.	pati-m	paitî-m	πόσι-ν	hosti-m	páti-n	gast'
f.	prîti-m	âfrîtî-m	πόρτι-ν	siti-m	áwi-n	anst'
n.	vâri	vairi	ἴδρι	mare		
m.	sûnu-m	pasû-m	ἴχθυ-ν	portu-m	sunu-n	sunu
f.	tanu-m	tanû-m	πίτυ-ν	socru-m		handu
n.	madhu	madhu	μέθυ	pecu	darkû	faihu
m. f.	gâ-m	ga-nm	βοῦ-ν	bov-em		
f.	nâv-am	...	ναῦ-ν	nav-em		
f.	vâch-am	vâch-em	Fὄπ-α	voc-em		
m.	bharant-am	barĕnt-em	φέροντ-α	ferent-em	...	fijand
m.	âtmân-am	asman-em	δαίμον-α	sermon-em	...	ahman
n.	nâma'	nâma'	τάλαν	nomen	...	namô'
m.	bhrâtar-am	brâtar-ĕm	πατέρ-α	fratr-em	...	brôthar
f.	duhitar-am	dughdhar-ĕm	θυγατέρ-α	matr-em	...	dauhtar
m.	dâtár-am	dâtâr-ĕm	δοτῆρ-α	datōr-em		
n.	vachas	vachô	Fέπος	opus		

Nominative Plural of Nouns.

	Sanskrit.	Zend.	Greek.	Latin.	Lithuanian.	Gothic.
m.	vrĭkâ-s	...	λύκοι	lup'ī	wilkai	vulfô-s
n.	dânâ-n-i	dâta	δῶρα	dona	...	daura
f.	jihvâ-s	hizvâ-o	χῶραι	terrae	ranko-s	gibô-s
m.	patay-as	paity-ô	πόσι-ες	host'-es	...	gastei-s
f.	prîtay-as	âfrîty-ô	πόρτι-ες	mess'-es	âwy-s	anstei-s
n.	vârî-n-i	var'-a	ἴδρι-α	mari-a		
m.	sûnav-as	pasv-ô	ἰχθύ-ες	portū-s	sûnu-s	sunju-s
f.	tanav-as	tanv-ô	πίτυ-ες	socrū-s	...	handju-s
n.	madhû-n-i	madhv-a	μέθυ-α	pecu-a		
m. f.	gâv-as	geu-s	βό(F)-ες	bov-es		
f.	nâv-as	...	νᾶ(F)-ες	nav'-es		
f.	vâch-as	vâch-ô	Fὄπ-ες	voc-ēs		
m.	bharant-as	barĕnt-ô	φέροντ-ες	ferent-ēs	...	fijand-s
m.	âtmân-as	asman-ô	δαίμον-ες	sermon-ēs	...	ahman-s
n.	nâmân-i	nâman-a	τάλαν-α	nomin-a	...	namôn-a
m.	bhrâtar-as	brâtar-ô	πατέρ-ες	fratr-ēs		
f.	duhitar-as	dughdhar-ô	θυγατέρ-ες	matr-ēs	dughter-es	
m.	dâtár-as	dâtâr-ô	δοτῆρ-ες	datōr-ēs		
n.	vacha(n)s-i	vachanh-a	Fέπε(σ)α	oper-a		

* The apostrophe indicates that a letter has been dropped.

Accusative Plural of Nouns.

	Sanskrit.	Zend.	Greek.	Latin.	Lithuanian.	Gothic.
m.	vrĭkâ-n	vĕhrka-n	λύκο-υς	lupō-s	wilkû-s	vulfan-s
n.	dânâ-n-i	dâta	δῶρα	dona	rankà-s	daura
f.	jihvâ-s	hizvâ-o	χώρᾱ-ς	terrā-s	. . .	gibô-s
m.	patî-n	paity-ô	πόσι-ας	hostī-s	. . .	gasti-ns
f.	prîtî-s	âfrîtî-s	πόρτῑ-ς	messī-s	âwy-s	ansti-ns
n.	vârî-n-i	var'-a	ἴδρι-α	mari-a		
m.	sûnû-n	pasv-ô	ἰχθύ-ας	portū-s	sûnu-s	sunu-ns
f.	tanû-s	tanû-s	πίτῡ-ς	socrū-s	. . .	handu-ns
n.	madhû-n-i	madhv-a	μέθυ-α	pecu-a		
m. f.	gâ-s	gâu-s	βό(ϝ)-ας	bov-ēs		
f.	nâv-as	. . .	νᾶ(ϝ)-ας	nav-ēs		
f.	vâch-as	vâch-ô	ϝόπ-ας	voc-ēs		
m.	bharat-as	barĕnt-ô	φέροντ-ας	ferent-ēs		
m.	âtman-as	asman-ô	δαίμον-ας	sermon-ēs	. . .	ahma-ns
n.	nâmân-i	nâman-a	τάλαν-α	nomin-a	. . .	namôn-a
m.	bhrâtrî-n	brâthr-eus ?	πατέρ-ας	fratr-ēs		
f.	duhitrî-s	dughdhĕr-eus ?	θυγατέρ-ας	matr-ēs	dughter-es	
m.	dâtrî-n	dâthr-eus ?	δοτῆρ-ας	datōr-es		
n.	vachâ(n)s-i	vachanh-a	ϝέπε(σ)α	oper-a		

Present Tense of the Verb 'To Place' (Stand).—Crude Form, *Stha* or *Sta.*

	Sanskrit.	Zend.	Greek.	Latin.	Old High German.	Lithuanian.	Old Slavonic.
Singular.	ti-sthâ-mi	hi-stâ-mi	ἵ-στᾱ-μι ἵ-στη-μι	si-st-o	stâ-m	stow-mi	sto-jû
	ti-stha-si	hi-sta-hi	ἵ-στᾱ-ς ἵ-στη-ς	si-st-is	stâ-s	stow-i	sto-ïsi
	ti-stha-ti	hi-sta-ti	ἵ-στᾱ-τι ἵ-στη-σι	si-st-it	stâ-t	stow	sto-ïtj
Dual.	ti-sthâ-vas	. . .	. . .	. . .	. . .	stow-iwà	sto-ïva
	ti-stha-thas	hi-sta-thô ?	ἵ-στα-τον	. . .	. . .	stow-ita	sto-ïta
	ti-stha-tas	hi-sta-tô	ἵ-στα-τον	. . .	. . .	(Same as Sing.)	ste-ïta
Plural.	ti-sthâ-mas	hi-stâ-mahi	ἵ-στα-μες ἵ-στα-μεν	si-st-imus	stâ-mês	stow-imè	ste-ïm
	ti-stha-tha	hi-sta-tha	ἵ-στα-τε	si-st-itis	stâ-t		
	ti-stha-nti	hi-stĕ-nti	ἵ-στα-ντι	si-st-unt	stâ-nt	(Same as Sing.)	ste-jatj

Present Tense of the Verb 'To Give.'—Crude Form, *Da.*

	Sanskrit.	Zend.	Greek.	Latin.	Lithuanian.	Old Slavonic.
Singular.	da-dâ-mi	da-dhâ-mi	δί-δω-μι	da-o, do	du-(d)-mi	da-(d)-mj
	da-dâ-si	da-dhâ-hi	δί-δω-ς	da-s	du-d-i	da-(d)-si
	da-dâ-to	da-dhâi-ti	δί-δω-τι δί-δω-σι	da-t	du-s-ti	da-s-tj
Dual.	da-d-vas	. . .	. . .	. . .	du-(d)-wa	da-d-eva
	da-t-thas	da-s-tô ?	δί-δο-τον	. . .	du-s-ta	da-s-ta
	da-t-tas	da-s-tô ?	δί-δο-τον	. . .	(Same as Sing.)	da-s-ta
Plural.	da-d-mas	da-de-mahi	δί-δο-μες	da-mus	du-(d)-me	da-(d)-my
	da-t-tha	da-s-ta ?	δί-δο-τε	da-tis	du-s-te	da-s-te
	da-dâ-ti	da-dĕ-nti	δι-δό-ντι δι-δό-ασι δι-δοῦσι	da-nt	(Same as Sing.)	da-d-jatj

Present Tense of the Verb 'To Be.'—Crude Form, *As* or *Es.*

	Sanskrit.	Greek.	Latin.	Lithuanian.	Old Slavonic.	Gothic.
Singular.	as-mi	ἐμ-μί ἐ-μί	s-um	es-mi	jes-mj	ï-m
	a-si	ἐσ-σί	es	es-si	je-si	ïs
	as-ti	ἐσ-τί	es-t	es-ti	jes-tj	ïs-t
Dual.	s-vas	. . .	. . .	es-wa	jes-va	si-yu
	s-thas	ἐσ-τόν	. . .	es-ta	jes-ta	si-yuts ?
	s-tas	ἐσ-τόν	. . .	(Same as Sing.)	jes-ta	. . .
Plural.	s-mas	ἐσ-μές	s-umus	es-me	jes-my	si-yum
	s-tha	ἐσ-τε	es-tis	es-te	jes-te	si-yuth
	s-anti	(σ)-εντι	s-unt	(Same as Sing.)	s-ûtj	s-ind

Remarks on the preceding Tables.

Numerals.—The numerals which are subject to inflection are given in their crude forms; and in the Latin and Greek lists several antient forms are inserted, which show more clearly the connexion of the numerals of these languages with those of the cognate tongues. The only numeral which appears to have more than one root to express the same number is "one." All the languages, with the exception of the Sanskrit, Zend, and Persian, express the notion of unity by the same word, *en*, *un*, *ain*, *ein*, &c., with a *w* sound before it in some of the languages, as the Lithuanian and English, and probably also in the Latin; in the

Greek this sound appears under the form of an aspirate. The Sanskrit *éka*, which is probably the same as the Persian *yik*, is also found in the cognate languages; as in the Greek ἑκά-τερος and ἕκα-στος, and in the English *each*. Bopp has suggested that this irregularity has arisen from the numeral 'one' being derived from the different pronouns of the third person. The form of *en*, *un*, &c., he connects with the Sanskrit pronoun *éna*, and the Zend *aēva* with the Sanskrit pronominal-adverb *éva* and *évam*.

Pronouns.—The cases in the singular number of the first personal pronoun appear in all these languages to have two roots; one from which the nominative is formed, and the other from which the oblique cases are derived. The Sanskrit nominative *ah-am* consists of two parts; namely, *ah* and *am*, of which *am* is merely a termination, occurring in the Zend *az-ĕm*, and the Greek ἐγ-ών. The root *ah* appears in ἐγ-ών, *eg-o*, *ik*, *ich*, *ih*, &c. The oblique cases are formed from a root *m*, followed by a vowel. All the cases of the plural are formed from a root *v*, followed by a long vowel. In the nominative plural of the Sanskrit *vay-am* the same termination is added as occurs in the singular.

In the second personal pronoun, the cases of the singular number are formed from the root *tu*. In the nominative singular of the Sanskrit, Zend, and Greek the same termination is added as in the nominative singular of the first personal pronoun. The vowel of *tu* is changed in the formation of the oblique cases into the semi-vowel *v* or *w*. The plural cases are formed from *yu* and *vas*.

The two first personal pronouns are the same in the Celtic dialects as in the other Indo-Germanic languages; but they are not given in the preceding list, because they are not subject to inflection.

First Personal Pronoun.

Erse.	Welsh.
Singular. me	mi, Reduplicated form, my-mi
Plural. sinn, inn	ni, Reduplicated form, ny-ni

Second Personal Pronoun.

Erse.	Welsh.
Singular. tu, thu	ti, Reduplicated form, ty-di
Plural. sibh, ibh	chwi, Reduplicated form, chwy-chi

The personal pronoun of the third person, answering to the Greek ἕ and the Latin *se*, is not found in the Sanskrit; but it exists in many of the cognate languages, as the following table will show:—

	Zend.	Greek.	Latin.	Gothic.	Lith.	O Slav
Singular Acc.	——	σφέ, ἕ	se	sik	sawen	sja
Singular Gen.	hè, hôi	οὗ	sui	seina	sawens	sebe
Singular Dat.	hé, hôi	οἷ	sibi	sis	saw	sebje, si

The demonstrative pronoun, one declension of which is given in the preceding tables, appears to have been originally a personal pronoun. The termination of the third person of the verb was probably borrowed from this pronoun, of which the root is *ta* or *sa*. The demonstrative pronoun, the relative, and the article, as it is called, have all one origin. The English *he*, *she*, *it*, and *the*, *this*, *them*, &c., contain the same root *ta*, or *sa*. In the Greek, the aspirate has taken the place of the τ or σ in the nominative singular; but the words σήμερον, or τήμερον, 'this day,' and σῆτες, 'this year,' point to a primitive σός, σή, τὸ(τ), as in Sanskrit and Gothic. The Latin *iste* probably contains the same root *ta* or *sa*.

In the Celtic languages this pronoun occurs under the following forms:—

Erse.

	M.	F.
Singular.	se, he, e.	si, she, i
Plural.	siad, iad	

Welsh.

	M.	F.
Singular.	ev, evo, eve, ve, vo, e, o.	hi; reduplicated hihi
Plural.	hwy, hwynt; reduplicated hwynthwy	

The original form of the pronoun is preserved in the Erse *se*. Dr. Prichard supposes that the Welsh had originally the same form, and that the initial *s* was softened into *h*, and at length dropped entirely, giving us the words *e* and *o*. *Eve* and *evo* he regards as reduplicated forms of *e* and *o*.

The preceding examples are sufficient to prove the affinity of the pronouns in the different branches of the Indo-Germanic languages; and, if our limits permitted, many more examples might be adduced. The interrogative pronoun is the same in all these languages; in the Sanskrit, Zend, and Lithuanian its crude form is *ka*, which in Latin becomes *qui* or *quo*, and in Gothic *hwa*. The words κότε, πότε; κῶς, πῶς; κότερον, πότερον; κόσος, πόσος, &c., in Greek, point to a primitive κός, κή, κό. The same root occurs in the old High German and Slavonic languages, in the English *who*, *which*, *what*, and in the modern German *wer* and *was*.

The pronominal adverbs of the Indo-Germanic languages present many striking points of affinity. The termination *dâ*, for instance, in Sanskrit, indicating time, occurs also in the Greek, Latin, Lithuanian, and old Slavonic tongues:—

Sanskrit.	Greek.	Latin.	Lithuanian.	Old Slavonic.
ka-dâ	πό-τε	qua-(n)do	ka-dà	ko-(g)-da
ta-dâ	τό-τε	——	ta-dà	to-(g)-da
ya-dà	ὅ-τε	——	——	je-(g)-da

Nouns.—The examples are classed according to the final letter of the Sanskrit crude forms, which are prefixed to the Sanskrit column. Our limits have only permitted us to select examples from the nominative and accusative cases; but they are amply sufficient to prove that the inflection of nouns is essentially the same in all those languages from which the examples are taken.

Verbs.—The most striking marks of relationship may be traced in the mode of conjugating the verb in the various branches of the Indo-Germanic languages. The verbs, given in the preceding lists, have been selected for the purpose of pointing out the great similarity of the personal terminations of the verbs in all these languages. Even in some instances, in which there is a considerable difference, as in the case of the Latin, which usually has the termination *o* in the first person singular of the verb, it may be proved that there was a more ancient form in the same language, which bore a greater resemblance to the usual termination of the kindred languages. Thus it may be shown from the first person singular of the past-imperfect (*regeba-m*), future (*rega-m*), and past perfect tenses (*rexera-m*) of the indicative, as well as from the tenses of the subjunctive, and such words as *sum* and *inquam*, that *m* was the usual sign of the first person singular in the Latin language. The personal endings of the verbs in the Celtic languages, though they differ in some respects very widely from the cognate tongues, nevertheless preserve the same terminations in several cases. The following list contains the personal endings of the verbs in the Welsh language:—

		First form.	Second form.	Third form.
Sing.	1	—av	—ais	—wn
	2	—i	—aist	—it
	3	root simply	—odh	—ai
Plur.	1	—wn	—om	—em *or* ym
	2	—wch	—och	—ech *or* ych
	3	—ant	—ont	—ent *or* ynt

It is a characteristic of the conjugation of many Latin and Greek verbs to add certain letter or letters to the crude form of the verb in the present tense, and those tenses formed immediately from the present. Thus in Latin, *n* and *sc* are frequently added, as in *tem-n-o*, *sper-n-o*, &c., and in *cre-sc-o*, *no-sc-o*, &c. In the same manner the terminations ν, νυ, αν, σκ, and many others, are added to Greek verbs; as in δάκ-ν-ω, τίμ-ν-ω, κάμ-ν-ω; δείκ-νυ-μι, ζεύγ-νυ-μι, λανθ-άν-ω; μανθ-άν-ω; γι-γνώ-σκ-ω, &c. Frequently, in both of these languages, a letter is inserted, or the first letter of the word is reduplicated with a short vowel in the present tense; as in *ta(n)g-o*, *li(n)qu-o*, *fu(n)d-o*, *tu(n)d-o*, *cu(m)b-o*, *ru(m)p-o*, *si-st-o*, *gi-gn-o*; and in λα(ν)θ-άν-ω, μα(ν)θ-άν-ω, λα(γ)χ-άν-ω, λα(μ)β-άν-ω, δί-δω-μι, ἵ-στη-μι, τί-θη-μι, γι-γνώ-σκ-ω.

The Teutonic languages have lost these variations; but in the Sanskrit and Slavonic verbs the present tense is frequently modified by the addition of the same letters as in Latin and Greek. In the Sanskrit the verb is divided into ten conjugations, according to the letters which are added

to the present tense of the verb. The third conjugation, for example, is characterized by the reduplication of the first letter of the verb with a short vowel, of which an instance has been given above in the present tense of the verb 'to give.' The characteristic of the ninth conjugation is *nâ*, or *nî*, inserted between the crude form and the personal terminations of the verb. The Latin, Greek, and Slavonic languages form the present tenses of manv verbs in a similar manner.

		Sanskrit.	Greek.	Latin.	Lithuanian.	Old Slav.
Sing.	1	str-nâ-mi	δάκ-ν-ω	ster-n-o	gáu-nu	gyb-nû
	2	str-nâ-si	δάκ-ν-ε,ις	ster-n-i,s	gáu-n'-i	gyb-ne-si
	3	str-nâ-ti	δάκ-ν-ε(τ)ι	ster-n-i,t	gáu-na'-	gyb-ne-tj
Dual.	1	str-nî-vas	—	—	gáu-na-wa	gyb-ne-va
	2	str-nî-thas	δάκ-ν-ε,τον	—	gáu-na-ta	gyb-ne-ta
	3	str-nî-tas	δάκ-ν-ε,τον	—	same as Sing.	gyb-ne-ta
Plur.	1	str-nî-mas	δάκ-ν-ο,μεν	ster-n-i,mus	gáu-na-me	gyb-ne-m
	2	str-nî-tha	δάκ-ν-ε,τε	ster-n-i,tis	gáu-na-te	gyb-ne-te
	3	str-na-nti	δάκ-ν-ο,ντι δακ-ν-ουσι	ster-n-u,nt	same as Sing.	gyb-nû-tj

The past-imperfect and aorist tenses of the Greek verb are formed in a manner very similar to the preterite tenses of the Sanskrit. The Sanskrit preterite, which corresponds to the past-imperfect of the Greek verb, is formed by prefixing the augment *a*, and shortening the personal terminations.

EXAMPLE OF PAST-IMPERFECT.

	Sanskrit.	Greek.
Sing.	a-tud-am	ἔ-τυπτ-ον
	a tud-as	ἔ-τυπτ-ες
	a-tud-at	ἔ-τυπτ-ε
Dual.	a-tud-âva	
	a-tud-atam	ἐ-τύπτ-ετον
	a-tud-atâm	ἐ-τυπτ-έτην
Plur.	a-tud-âma	ἐ-τύπτ-ομεν
	a-tud-ata	ἐ-τύπτ-ετε
	a-tud-an	ἔ-τυπτ-ον

The other Sanskrit preterite, which corresponds to the two aorists of the Greek verb, has, according to Bopp's division, seven forms; of which the four first agree more or less with the Greek first aorist, the fifth and sixth with the Greek second aorist, and the seventh, which, besides the augment, has also a reduplication of the first syllable, with the Greek past perfect. The four first forms always add the letter *s* in order to form the preterite; thus from the crude form *kship* is derived a preterite *a-kshaip-sam*, corresponding to the Greek ἔ-τυψ-σα(μ). The fifth and sixth forms have the same terminations as the past-imperfect tense, and differ from that tense nearly in the same manner as the second aorist in Greek differs from the Greek imperfect; thus from the crude form *lip* is derived a preterite *a-lip-am*, corresponding to the Greek ἔ-τυπ-ον. In the same manner, from the crude forn. *dâ*, the Sanskrit forms a past-imperfect *a-da-dâ-m*, and a preterite *a-dâ-m*, analogous to the Greek ἐ-δί-δω-ν, and ἔ-δω-ν.

The perfect tense seems originally to have been formed on the same principles in the Sanskrit, Latin, Greek, and Teutonic languages; namely, by a complete or partial reduplication of the crude form of the verb. Thus in Sanskrit, from *bhrî* is formed the perfect *ba-bhār-a;* from *tri*, the perf. *tu-tār-a;* from *tup*, the perf. *tu-top-a;* from *kship*, the perf. *chi-kshêp-a*. In the same manner in Greek, from λιπ is formed the perfect λέ-λοιπ-α; from μεν, the perf. μέ-μονα; from θαλ, the perf. τέ-θηλ-α; from φαν, the perf. πέ-φην-α. In Latin also we have the perfects *cu-curr-i*, *spo-spond-i*, *ce-cīd-i*, *ce-cīd i*, *mo-mord-i*, and *po-posc-i*, from the crude forms *curr*, *spond* or *sponde*, *căd*, *cæd*, *mord* or *morde*, and *posc;* and in Gothic we have the perfects *skái-skáid*, *mái-máit*, *hlái-hlaup*, *sái-salt*, *sái-slêp*, from the verbs *skáida*, *máita*, *hláupa*, *salta*, and *slêpa*.

It is, perhaps, scarcely necessary to remark that the preceding observations relate to only a small part of the resemblances which are found in the grammatical structure of the Indo-Germanic languages. An examination of the manner in which the comparative and superlative degrees of adjectives are formed, and especially a comparison of the suffixes added to form verbs and nouns, as well as a list of the more simple prepositions, would afford many additional points of resemblance; but the examples which have been already given are sufficient to prove the close affinity of these languages in the laws which regulate their grammatical forms.

The affinity of these languages may be still further shown by a comparison of such words as express the most common objects and the most simple ideas, and which, from their very nature, are the least likely to have been derived from any other language. In compiling the following lists considerable assistance has been derived from a useful book lately published by Mr. Winning, entitled 'A Manual of Comparative Philology.' The words in the Celtic column are taken from the work of Dr. Prichard on the 'Eastern Origin of the Celtic Nations.' The Zend and Persian forms are so closely allied to the Sanskrit, that it has been thought advisable to place them under the same column. In the column devoted to the Slavonic languages, *Lith.* stands for Lithuanian; *Lett.* for Lettic; *O. Pr.* for Old Prussian; and those words which have no letters before them belong to the Old Slavonic language. In the Teutonic column, *Goth.* stands for Gothic; *G.* for German; *O. H. G.* for Old High German; *L. G.* for Low German; *A. Sax.* for Anglo-Saxon; *Engl.* for English; and *O. Engl.* for Old English. In the Celtic list, *Er.* stands for Erse, and *W.* for Welsh. The English words in the first column give the meaning of the words in the cognate languages. All the Sanskrit, Greek, and Latin words are given in their crude forms.

Words denoting Relationship, &c.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Father . . .	pitri . . . . Z. paitar P. pader	πατηρ . . .	pater . . .	bat	O. H. G. vatar . L. G. fader	Er. athair
Mother . . .	mâtri . . . . L. matar P. mader	μητηρ, ματηρ .	mater . . .	mater. . . . Lith. moter	G. mutter . .	Er. mathair
Son	sunu	. . .	. . .	syn . . . . Lith. sunu-s	Goth. sunu-s. . G. sohn	
Daughter . . .	duhitri . . . Z. dughdhar P. dokhter	θυγατηρ. . .	. . .	dotcher . . . Lith. dukter	Goth. dauhtar . G. tochter	Er. dear
Brother . . .	bhrâtri . . . Z. bratar P. brader	φρατορ . . . φρατρια (fraternity)	frater . . .	brat	Goth. brothar . G. bruder	Er. brathair W. brawd
Sister . . .	swasri . . .	. . .	soror . . .	sestra. . . . Lith. sesser	Goth. swistar . G. schwester. .	Er. siur
Father-in-law .	swasurah . .	ἑκυρο . . .	socer . . .	swekar . . . Lith. szessur. .	Goth. svaihra .	W. chwegrwn
Mother-in-law .	swasruh . . .	ἑκυρα . . .	socru . . .	swekru . . .	Goth. svaihro .	W. chwegyr
Daughter-in-law .	snushâ . . .	νυο . . .	nuru . . .	snocha . . .	A. Sax. snoru G. schnur	
Brother-in-law .	dâvri . . .	δαερ. . . .	levir . . .	dever . . . . Lett. deeveris .	O. H. G. zeihhur A. Sax. tacor	
Master and *Husband*	pati . . . . Z. paiti-s	ποσι . . .	. . .	Lith. pati-s . .	Goth. fath-s	

Words denoting Relationship, &c.—continued.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Mistress and *Wife*	patnî	ποτνια as in *Il.* xxi. 470, πότνια θηρῶν.	...	Lith. patti		
Man	nara Z. nairya P. nar	α-νερ	...	...	...	nêr (lord)
Man	vîra Z. vairya (strong)	...	viro, vir	Lith vyra,s Lett. vyr,s	Goth. vair-s	Er. fear W gwyr, wyr
Man	manu-shya	...	ho-mon?	mush, monsh. Lith. zmones	G. mann mensch	
Woman	jani Z. gena P. zenne	γυναικ γυνη.	...	gena O. Pr. genna	Goth. quino O. Engl. quean	Er. gean
Woman	vâmanî	...	fēmina	...	Engl. woman	Er. femen

Parts of the Body, &c.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Eye	akshi Z. ashi	οκκο οσσο	oc-ulo	oko Lith. aki,s	Goth. augo G. auge	
Brow	bhrû Z. bru, bruat P. a-bru	ο-φρυ	...	browi	O. H. G. prawa	Er. brai
Nose	nâsâ Z. nao	...	naso	nos Lith. nosi,s Lett. nassi,s	G. nase	
Tooth	danta	ο-δοντ	dent	danti,s	Goth. thuntu,s G. zahn	Er. dend W. dant
Nail	nakha P. nakhan	ο-νυχ	ungui	nogot Lith. naga,s	G. nagel	
Knee	ganu Z. genu P. zanu	γονυ γονατ	genu	...	Goth. kniu G. knie	
Right Hand	dakshina Z dashina	δεξιο	dextero. dexter	dessna Lith. deszine.	Goth. taihsvo	Er. deas
Foot	pada Z. padha	ποδ	ped	Lith. pada,s	G. fuss	
Tear	asru P. zareh	δακρυ	lachruma	Lith. aszara Lett. assara	Goth. tagr	Er. deor W. deigryn
Hair	kêsa P. kisu	...	cæsa-rie	Lith. kassa		

Objects of Nature and Art.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Sun	hêli	ἡλιο	sōl	Lith. saule	Goth. sauil	W. haul
Moon or *Month*	mâsa Z. mao P. mah	μην, μηνη	mensi	Lith. mienu	Goth. mena	Er. mios
Star	târâ Z. staro	α-στερ	stella (diminutive of *stera*; as *te-nella*, of *tene-ra*.)	...	Goth. stairno. G. stern	W. seren
Sky, Cloud	nabha nabhâ	νεφες (N. νεφος) νεφελη	nube, nubi. nebula	Lith. debbesi,s Lett. debbe,s.	O. H. G. nepal G. nebel	Er. neal W. niwl
Water	uda	ὑδατ ὑδερ	udo, unda	voda Lith. vandu Lett. uden,s O. Pr. und,s	Goth vato A. Sax. wæter O. H. G. wazar G. wasser Engl wet	Er. dour W. dwr
Day	dyu	διο?	diu diu-rno die	den Lith. diena Lett. deena	Goth. dag,s A. Sax. dæg G. tag	Er. di, dia W. dydh
Night	nisâ nakta-m (Adverb 'by night' *nakta* is not found by itself as a sub-stantive.)	νυκτ	noct.	noc' Lith. nakti,s Lett. nakt,s Russ. notch'	Goth. naht,s G. nacht	Er. nochd W. nôs
Sea	mîra	...	mari	more Lith. mare,s Russ. more	Goth. marei G. meer	Er. muir W. môr
Earth	dharâ	ερα ερα-ζε	terra tellur	...	Goth. airtha G. erde	W. daiar, dhaiar Er. talamh, tellur
Earth	go. Z. zao	γη	...	zemia, zemla. Lett. semme	Goth. gavi G. gau (district)	Er ce
Fire	agni	...	igni	ogni Lith. ugni,s	...	Er. aghna
Light	âlôka from *lôch*, 'to see'	λευκο (adj.) λυκο-φωτ	luc	luc'	Goth. liuath G. licht	Er. leos W. lhwg
Cloud	mêgha P. migh	ο-μιχλη	...	mgla Lith. migla	Goth. milhma	

Objects of Nature and Art—continued.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Winter . . .	hima . . . . (snow) Z. zima	χειμ-ων . .	hiem . . .	zima . . . . Lett. seema . .		
Wine	. . .	οινο or ϝοινο . .	vino . . .	vino . . . . O. Pr. vyna	G. wein	Er. fin W. gwin, win
Clothing . . .	vâsa . . . . Z. vashtra	ϝεσθητ . . .	vesti . . .	. . .	Goth. vasti	
Door	dwar . . . . P dar	θυρα . . .	fori. . .	dwer . . . . Lett. durri,s	Goth. daura . . G. thür	Er. doras W. dor
Carriage or *Axle-tree*	aksha	αξον . . .	axi	Lith. assi. . .	O. H. G. ahsa G. achse Engl. axle	
Carriage or *Wheel*	ratha . . . . Z. ratha	. . .	rota. . . .	Lith. rata,s . . Lett. rat,s	G. rad . . .	Er. roth *Gallic*, rheda, see Quinctil. I. 5
			Adjectives.			
Great . . .	mah-at . . . . Z. mazo	μεγα . . .	mag-no . .	mogu . . . (*to be able*) Lith. mac-ni,s (*power*)	Goth. mikils . O. H. G. mihil O. Engl. muchel	Er. meall
Broad . . .	prithu . . .	πλατυ . . .	lato . . .	Lith. platus . . Lett. plat,s	G. breit and platt Engl. broad & flat	
Thin	tanu . . . . . From the verbal root tan. (See below.)	τανυ, in composition; as τανυ-δρομο	tenui . . .	tanau . . .	G. dünn . . .	W. denau
Young	yuv-an . . .	. . .	juv-eni. . .	jaunii . . . Lith. jauna,s	G. jung . . .	W. jan jeuant
New	nava . . . . . P. nu	νεϝο . . .	novo . . .	novii . . . . Lith. naiya s	Goth. nivi,s . . G. neu	Er. nuadh W. newydh
Middle . . .	madhya . . . Z. maidhya P. mijan	μεσο . . . μετα	medio . . .	mezdu . . . (between)	Goth. midi,s . . O. H. G. midja,s G. mittel	Er. meadhon
Red	rôh-ita . . .	ε-ρυθ-ρο . . .	rub.ero. . . rut,ilo ruf.o	Lith. rudda,s. . Lett. rud,s	O. H. G. rot. . G. roth Engl. ruddy	Er. ruadh
Both . . .	ubha . . . . . Z. uba	αμφω . . .	ambo . . .	oba . . . . Lith. abbu Lett. abbi	Goth. ba G. beide	
			Verbal Roots.			
To Generate . .	jan . . . . . Z. zan	γεν . . . . γεν-ες (N. γενος) γι-γν-ομαι	gen. . . . gen-es (N. gen-us) gen-itor gi-gn-o	Lith. gemu . . Lett. dsimt	Goth. kin . . Engl. kin	W. geni E. gein (*offspring*)
To Die . . .	mri . . . . . mara . (death) Z. mar P. murd-en	μορ-το . . . (μρο-το) βρο-το See 'Journal of Education,' No. 5. p. 100	mor . . . mor-tuo mor-t	mri- . . . . Lith. mir Lett. mir-t	Goth. maurthr . G. mord	Er. marbh (dead) W. marw (die)
To Live . . .	jîv . . . . . Z. ji. or jva	ζα	vīv	jivu, jiva . . . (*life*) O. P. giva (*life*)	Goth. quivs . . (*living*) O. Engl. quick	Er. beo W. byw, or vyw
To Know . . .	jnâ	γνω . . . γι-γνω-σκ γνω-μη	gno . . . co-gno-sc (g)no-sc gna-ro (g)no-to	zna	Goth. kann . . G. kenn-en Engl. ken	W. gwn
To Know . . .	vid* . . . . . Z. vid	ϝιδ . . . . ϝιδ-μεν	vid . . . . vid-e	vid . . . . Lith. veizd-mi	Goth. vid. . . G. wiss-en Engl. wit, wot, wise	W. gwydh and wydh (*knowledge*) Er. fis, fios (*knowledge*)
To Hear . . .	sru	κλυ . . . κλυ-το	clu . . . . clu-e in-clu-to	slu . . . . Lith. klau Russ. sluch (*hearing*)	Goth. hliuma (ear)	W. clyw (*hearing*) Er. cluas (ear)
To See . . .	dris	δερκ. . . . δε-δορκ-α	. . .	Lith. dairaus . (*look about*)	. . .	Er. dearc
To Lick. . . .	lih (h guttural) .	λειχ . . .	li(n)g . . .	. . .	Goth. laigw,an . A. Sax. licc,an	Er. lighim

* This verb in Sanskrit, Greek, and Gothic, has no Present Tense, but uses the Perfect in the sense of the Present; and in the inflection of the tense the short vowel of the root is in each language changed into a long vowel in the Singular Number. In the Greek οἶδ-α, the ι represents the ϝ which appears in ϝιδ-μεν, &c.

	Sanskrit.	Greek.	Gothic.
Sing.	vêda	οἶδ-α	vait
	vêt-tha	οἶσ-θα	vais-t
	vêd-a	οἶδ-ε	vait
Plur.	vid-ima	ϝίδ-μεν	vit-um
	vid-a(tha)	ϝίσ-τε	vit-uth
	vid-us	ϝίσ-ασι	vit-un

Verbal Roots—continued.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
To Put, or Place.	sthâ Z. sta	στα	sta	sta	Goth. stand,an	Er. stadam
To Think	man man-as (*mind*) Z. man	μιν μι-μνη-σκ μιν-ες (N.μιν-ος)? μι-μον-α ?	min, or men me-min-i men-t mon-e	mjen Lith. men	G. mein-en Engl. mean	W. menw (*mind*)
To Go.	i *Present Tense* ê-mi ê-shi ê-ti i-mas i-tha y-anti	ι Present Tense εἶ-μι εἶ-ς εἶ-τι, εἶ-σι ἴ-μες ἴ-τε ἴ-ασι (from ἴ-αντι)	i i-re	i	Goth. iddja (*I went*)	
To Sit.	sad	ἰδ ἰδ-ες (N. ἰδ-ος) (*seat*)	sid, or sed sed-e	Lith. sed	Goth. sit-an G. sitz-en	Er. suidham
To Join	yug	ζυγ ζευγ-νυ-μι ζυγ-ο (N.ζυγ-ον)	jug ju(n)g jug-o	jgo	Goth. juk Engl. yoke	W. jau
To Carry	vah	Fοχ Fοχ-ες (Fοχ-ος)	veh	Lett. wes	Germ. wag-en O. Engl. wain	
To Bear	bhri	φερ	fer	. . .	Goth. bair-an A. Sax. bear-an	Er. bheirim
To Make	kri	κρα κραιν or κραν	cre cre-a	O. Pr. kura (*he created*)	O. H. G. karaw-an	Er. ceard (*workman*)
To Give	dâ Z. dha	δο, δω	da	da	. . .	Er. daighim (*I give*)
To Place	dhâ Z. da	θε θη	. . .	Lith. de	O. H. G. tu-on O. L. G. do-an G. thu-n Engl. do	
To Be.	bhû Z. bu P. bu-den	φυ	fu	bu Lith. and Lett. bu	O. L. G. be-on G. bi-n (*I am*) Eng. be	Er. bu mi (*I was*) W. bu
To Be.	as Z. as P. es	ες	es	jes Lith. es O. Pr. as	Germ. is-t (*he is*) Engl. is	Er. is W. ys
To Eat	ad	ἐδ	ed	ed O. Pr. is	Goth. it-an O. H. G. iz-an G. ess-en	Er. ith W. ysu
To Drink.	pî	πι or πο πι-ν-(ω) πο-το	po po-to porta (*verb*) bi-b-o, like si-st-o gi-gn-o	pju Lith. po		
To Call	vach Z. vac	βαγ or βακ βαγ-ματ βακ-σι	voc	O. Pr. vack		
To Heat	tap Z. tap	τυφ (*burn*) τεφ-ρα (*ashes*)	tep tep-ido	tep-leiu		
To Fear	bhî Z. bi-as (*fear*)	φοβ φοβ-ο	. . .	boi Lith. and Lett. bi	O.H.G. pi-pin-an	
To Strew	stri	στορ στορ-νυ-μι στρω-το	ster, or stra ster(n)-o stra-to	stre	Goth. strauj-an G. streu-en	
To Mix	misr	μιγ or μισγ μιγ-νυ-(μι) μισγ-(ω)	misc misc-e	Lith. miss	G. misch-en	W. mysgy
To Breathe	an	. . . αν-εμο	. . . an-ima an-imo	. . .	Goth. us-ana. (*breathe out, die*)	Er. anaim (*soul, spirit*)
To Stretch	tan	τιν τειν-ω ταν-υω	ten ten(d)-o	. . .	Goth. than(j)an G. dehn-en	taen

A brief examination of the family of languages, usually known by the name of Semitic, will tend to confirm the observations that have already been made respecting the affinity of languages. It will be seen that the various dialects of this family are related as closely to each other as the different branches of the Indo-Germanic race; and that they differ widely from the latter, both in their grammatical structure and in the majority of their roots.

The Semitic languages have derived their name from the real or supposed descent of the people who speak these languages from Shem, the son of Noah. They may be divided into three branches:—

I. The *Aramæan*, spoken in Syria, Mesopotamia, and Babylonia, may be subdivided into two branches; the Babylonian, or East Aramæan (sometimes, but erroneously, called Chaldee), and the Syriac, or West Aramæan.

II. The *Hebrew*, spoken in Palestine, and probably with little variation in Phœnicia and the Phœnician colonies, as Carthage, &c.

III. The *Arabic*, to which the Ethiopic is very closely allied, is at present spoken in many countries, but was originally confined to the peninsula of Arabia and Ethiopia.

In order to save room, the examples in the following lists have been taken from the Hebrew and Arabic languages alone, since they are the two most important branches of the Semitic family of languages.

In general the remarks already made on the changes of letters in the Indo-Germanic languages will hold good in

the Semitic family. One example of this deserves a distinct mention. In Hebrew *p* פּ and *f* פ are only distinguished by the dot in the former; in Arabic there is no *p*, and the Hebrew *p* is always expressed by *f*; as, *to do*, Heb. *pa'al*, Ar. *fa'ala*.

The nouns and verbs given below have been taken at random: they might easily be multiplied to almost any extent, so numerous are the roots which are common to the two languages. Those words only have been taken which are likely to be primitive words in any language:—

Numerals.

	Hebrew.	Arabic.
One	eḥad	ahad, or wahid
Two	shĕnē, shĕnēm	ithnāni
Three	shĕlosh	thalāth
Four	arba'	arba'
Five	ḥamish	ḥams
Six	shish	sitt
Seven	shib'	sib'
Eight	shĕmōn	thamān
Nine	tish'	tis'
Ten	'asār	'ashar
Hundred	meāh	meait
Thousand	elef	alf

Personal Pronouns.

	Separate.		Affixed.	
	Hebrew.	Arabic.	Hebrew.	Arabic.
1st Pers. Sing.	ani, *or* anōci	anā	i *or* ni	ī *or* nī
Pl.	ănū, anaḥnū, naḥnū	naḥnu	nu	nā
2d Pers. Sing. m.	attāh	anta	ca	ca
f.	at	anti	ĕc	ci
Pl. m.	attem	antom	cem	com
f.	atten	antonna	cen	conna
3d Pers. Sing. m.	hū (a)	howa	o	hu
f.	hī (a)	hiya	āh	ha
Pl. m.	hēm	hom	ām	hom
f.	hēn	honna	ān	honna

Demonstrative Pronouns.

	Hebrew.	Arabic.
This masc.	zeh	dzā
fem.	zoth	tā
These	ēlleh	ūlā
That. masc.	hallāzeh	dzāca, *or* dzalica
fem.	hallēzū	tāca, *or* tālica

The relative pronouns are often expressed in both languages by the article. They also have these forms.

Hebrew	Arabic.
asher (indec.)	aladzdzi (dec.) man (indec.)

Interrogative Pronouns.

	Hebrew.	Arabic.
Who?	mī	man
What?	mah	mā

Conjugation of the Present and Future Tenses of a Verb.

Lamad, *to learn.* | Kabala, *to kill.*

Preterite Tense.

		Hebrew.	Arabic.
Sing.	1st pers.	lāmad-tī	kabal-tū
	2d p. m.	lāmad-tā	kabal-tā
	2d p. f.	lāmad-t	kabal-tī
	3d p. m.	lāmad	kabal-a
	3d p. f.	lāmĕd-āh	kabal-at

Preterite Tense—continued.

		Hebrew.	Arabic.
Plur.	1st pers.	lāmad-nū	kabal-nā
	2d p. m.	lāmad-tem	kabal-tom
	2d p. f.	lāmad-ten	kabal-tonna
	3d p. m.	lāmĕd-ū	kabal-ū (a)
	3d p. f.	lāmĕd-ū	kabal-na

Future Tense.

Sing.	1st pers.	e-lmōd	a-kbol-u
	2d p. m.	ti-lmōd	ta-kbol-u
	2d p. f.	ti-lmĕd-ī	ta-kbol-īna
	3d p. m.	yi-lmōd	ya-kbol-u
	3d p. f.	ti-lmōd	ta-kbol-u
Plur.	1st pers.	ni-lmōd	na-kbol-u
	2d p. m.	ti-lmĕd-ū	ta-kbol-ūna
	2d p. f.	ti-lmōd-nāh	ta-kbol-na
	3d p. m.	yi-lmĕd-ū	ya-kbol-ūna
	3d p. f.	ti-lmōd-nāh	ta-kbol-nah

Words expressing relationship.

	Hebrew.	Arabic.
Father	Ab	Ab
Mother	ēm	ōm
Son	ben	ebn
Daughter	bath	bint
Brother	aḥ	aḥ
Sister	aḥoth, *fem. of* aḥ	aḥt, *fem. of* aḥ

Parts of the body.

	Hebrew.	Arabic.
Head	rōsh	rās
Eye	'ayin	'ain
Mouth	peh	fūh, fīh, fāh
Tooth	shēn	sinn
Ear	ozen	odzon
Hand	yād	yad
Heart	leb, *or* lēbāb	lobb

Familiar objects, animate and inanimate.

	Hebrew.	Arabic.
God	el	allah
Man	anash, īsh	nās
Men	ănāshim	ins
Lion	layish	laith*
One of a flock, *i.e.* a sheep, or goat.	seh	shāt, *or* shāhat
Ox	shūr	thaur †
Sun	shemesh	shams
Star	cocab	caucab
Heaven	shāma-yim (dual)	samā (sing.)
Earth	erets	ard ‡
Day	yōm	yawam
Night	lāyĕlāh	lail, *or* lailat
Water	ma-yim (dual)	maā (sing.)
Fire	(a)ūr	(a)owār ‖
River	nāhār	nahar
House	bayith	bait
Wall	sūr	sūr
Name	shēm	ism

* Compare Gr. λῖς, (Homer.) † Compare ταῦρος, taurus. ‡ Compare *earth, erde*, (Ger.) ‖ Compare aurora.

Verbal Roots.

	Hebrew.	Arabic.
Do	pā'al	fa'ala
Die	mūth	māta, *for* mawata
Eat	ācal	acala
Laugh	tsāḥak	daḥica
Place	nātsab	nasaba
Cry out; and hence read *or* recite.	kārā*	
Read		kara
Shine	hā'al	halla
Sit	gālash	jalasa†
Speak, *or* command	āmar	
Command		amara
Stand	'āmad	'amada
Weep	bācā	bacā
Write	cāthab	cataba

* Compare κράζω, and *cry*.
† By many of the Arabs, as for example, the Egyptians, ج is pronounced g.

It would be an interesting object of inquiry, if we possessed sufficient data from which a satisfactory conclusion might be drawn as to the affinities which exist between other languages not related to the Indo-Germanic and Semitic families. Such an inquiry might be of no small advantage in an historical point of view; since the use of languages, closely related to each other in their grammatical structure and their principal roots, must be allowed to furnish a strong presumption, if not a direct proof, that all the nations who speak such languages must originally have been one and the same people, however much their moral and social circumstances may differ, and however distant they may be from each other in geographical position. Such an investigation might perhaps lead to the conclusion, that the number of languages in the world, radically distinct from each other, is not so great as some philologists have represented; but at present our acquaintance with the greater number of languages is of too imperfect and unsatisfactory a nature to allow us to form an opinion on the subject. Our knowledge of many languages is limited to short lists of words, which have been copied down by voyagers or travellers, who have often only remained for a few days or weeks in the countries where the languages were spoken; and yet philologists have frequently ventured, on these lists alone, to maintain or deny the affinity of different tongues. Languages, such as the English and the Sanskrit, which differ in many important points, and which to a common observer may appear to be entirely distinct from each other, are proved by investigation to be closely allied; while others, such as the Chinese and Polynesian, which have been thought by many persons to be nearly related to each other, are shown by the researches of modern scholars to have no connexion. A comparison of two different languages cannot therefore be safely conducted without a complete or at least a tolerable acquaintance with the vocabulary and grammar of each.

But though a more complete knowledge of the various languages at present spoken may enable us to trace affinities that have never been suspected; yet it is not to be supposed that any examination will enable us to discover so many points of resemblance as to *prove* that *all* languages may be referred to a common origin. Many languages, with which we are already acquainted, differ so entirely in their vocabulary and grammatical structure, as to lead some philologists to the conviction that they were from the beginning formed upon different principles, and could never have had any connexion with each other. It may be asked, whence has this diversity of language arisen? The common opinion, derived from the testimony of the book of *Genesis*, refers all mankind to one common parentage; and it is believed by most persons that all mankind spoke one common language, till that event occurred known in Scripture by the name of the 'Confusion of Tongues,' when God miraculously caused many different languages to arise in place of the one that had hitherto been spoken. But a careful examination of the tenth and eleventh chapters of *Genesis* will not allow us to admit the correctness of this popular interpretation; for without supposing, with many orthodox commentators, that the miracle 'consisted rather in a temporary confusion of mind, producing as its effect a corresponding confusion of expression, than in any miraculous change in the permanent dialects,' it is evident from the tenth chapter of *Genesis* that the dispersion of Noah's family and their emigration to different parts of the earth happened *previous* to the confusion of tongues at Babel. Whatever this confusion of tongues may have been, it could only have had any effect upon that branch of Noah's descendants who remained in the land of Shinar, and could not therefore have affected the majority of the human race, who had already gone to other parts of the world.

Those persons who reject the popular interpretation of the eleventh chapter of *Genesis*, but at the same time believe that originally only one language was spoken in the world, maintain that the diversities of language may be accounted for 'by the operation of gradual causes arising from long separation, distant emigrations, and new associations, constantly modifying the simplicity of earlier language.' But allowing that these causes may have had great influence in modifying, and, to a certain extent, changing languages, yet they do not appear to be sufficient to account for the great dissimilarity that exists between languages which appear radically distinct, such for example as the Chinese and Sanskrit, on the supposition that these languages were originally one and the same. The nations of Germany and India are widely removed from each other in geographical position; we know from history that they have lived under a different form of government, in a different state of civilization, and in a different climate for upwards of 2000 years at least, and yet the languages spoken by these people still continue to bear the most striking proofs of identity in their vocabulary and grammatical structure.

Another mode of accounting for the diversity of languages is by supposing that the earth must have been originally peopled by several separate races, with languages peculiar to each. This opinion extensively prevailed among the Greeks and Romans, and has been advocated in modern times by many celebrated writers, such as Niebuhr and Von Humboldt. The greatest objection to this opinion arises from the Mosaic account of the creation, which certainly inculcates a different doctrine. Many biblical critics indeed maintain that the early chapters of *Genesis* are not to be interpreted literally, and that the word 'Adam' in particular merely means mankind in general, without determining the number of the species that were created. But such a mode of interpretation is open to many solid objections.

Many philologists have included all known languages under three great divisions, which they distinguish from one another by the following characters.

1. Languages composed of monosyllabic roots without any forms of grammar. To this class belong the Chinese idioms, in which we find nothing but naked roots, and in which the meaning of sentences is determined, not by grammatical relations, but by the position of words in a sentence.

2. Languages composed of monosyllabic roots, but with a great abundance of grammatical forms. To this class the Indo-Germanic, Armenian, and other languages belong.

3. Languages whose verbal roots consist in their present form of two syllables, and require three consonants for the expression of their fundamental meaning. This class is limited to the Semitic languages, which contain only few examples of compound words, and possess very few grammatical forms. It is however the opinion of Gesenius, Ewald, and the most eminent Semitic scholars of the present day, that these languages also were originally monosyllabic; which could easily be proved to be the fact by an examination and dissection of the most simple roots of the Hebrew and Arabic languages.

Our limits do not allow us to give even a list of the known languages, far less to attempt any systematic account of them. We must refer our readers who desire information on this subject to Adelung's 'Mithridates,' continued by Vater, 4 vols., 1805-1817; Marsden's 'Catalogue of Dictionaries, Vocabularies, Grammars, and Alphabets,' 1796; Vater's 'Linguarum totius Orbis Index Alphabeticus,' 1815, and 'Vergleichungstafeln der Europäischen Stamm-Sprachen und Süd-West-Asiatischer,' 1822. The principal varieties of the Asiatic languages have been briefly pointed out in the article ASIA (ii., 473-475); and the late Mr. Marsden has, in his 'Miscellaneous Works,' 1834, given us much valuable information respecting the languages spoken in the Polynesian Islands; by which he understands all those islands 'which extend through the intertropical region from Madagascar, or more obviously from Sumatra, as its western, to Easter Island in the Pacific Ocean, as its eastern limit.' In the languages spoken throughout these islands, he remarks 'that there is a manifest connection between many of the words by which the inhabitants of these islands express their most simple perceptions; and in some instances, of places remote from each other, a striking affinity, insomuch that we may pronounce the various dialects, in a collective sense, to form substantially one great language.'

With respect to the American and African languages, Dr. Prichard, who has devoted great attention to this branch of linguistic study, remarks 'that the native races of North America may be referred by a classification of their dialects to a few great divisions, several of which extend as radii issuing from a common centre in the north-western part of the Continent, where it is divided from Asia by Behring's Strait. The traditions prevalent among the antient Mexicans seem to have derived credit from the discovery of a chain of nations extending almost from New Mexico to Mount St. Elias, in the neighbourhood of the Esquimaux Tschugazzi, their languages, particularly those of the

Ugalyachmutzi and Kolusshians, bearing a curious analogy to that of the Aztecs and Tlaxcallans. Another series of nations, the Karalit or Esquimaux, connected by affinities of dialect, has been traced from the settlements of the Tschuktschi, in Asia, along the polar zone to Acadia and Greenland. Light has also been thrown in a similar manner on the history of the Lenni Lenape, and the great kindred family of Algonquin nations, on that of the Iroquois, and likewise of the Floridian and other races of North America, by a comparison of their national tradition with the indications discovered in their dialects. One circumstance, which is perhaps of more importance than all the preceding, is the singular congruity in structure between all the American languages, from the northern to the southern extremity of the continent.'

'In Africa a remarkable and interesting fact was the discovery of a nation occupying nearly the whole northern region of that continent, to which the Kabyles of Mauritania and the Tuarik of the Great Desert belong, and whose branches extend from the oasis of Siwah on the eastern, to the mountains of Atlas, and even to the Canary Islands on the western side; the Quanches, the old inhabitants of those islands, whose remains are said to be embalmed in the mummy caves of Teneriffe, spoke, as it appears, a dialect of the same language as the Kabyles and Berbers. The Felatahs, who have spread themselves over the interior countries of Nigritia, have been traced by a similar investigation to the mountainous districts above the Senegal, where the Foulahs, who speak the same language, have been long known to Europeans as a people in many respects distinguishable from the negroes. To the southward of the equator a connection still more extended has been discovered among the native tribes across the whole of the same continent from Caffraria and the Mosambique coast on the Indian Ocean, to the countries which border on the Atlantic and form a part of the region termed the empire of Congo.'

One of the most interesting and important works on language that has yet appeared is a posthumous work of the late Wilhelm von Humboldt, entitled 'Ueber die Verschiedenheit des Menschlichen Sprachbaues und ihren Einfluss auf die geistige Entwickelung des Menschengeschlechts,' Berlin, 1836. The reader may also refer to Dr. Becker's *Organism der Sprache*, to his German Grammar, and to Harris's *Hermes*.

LANGUE D'OC. [FRANCE—*Literature*.]

LANGUEDOC, one of the most extensive and important of the provinces into which, before the Revolution, France was divided. It was bounded on the north by Lyonnais and Auvergne, and by Rouergue and Querci, subdivisions of Guyenne; on the east by the Rhône, by which it was separated from Dauphiné and Provence; on the south by the Mediterranean, the province of Roussillon, and the Pyrenees; and on the west by Couserans and Comminges, and by Rivière Verdun, a subdivision of Armagnac, all in Gascogne. Its extent, as described above, includes the county of Foix, which is a subdivision of it, though it constituted a separate military government previous to the Revolution. Its subdivisions and area, exclusive of Foix, were as follows:—

District.	Capital.	Sq. Miles
Vivarais	Viviers	2201
Rasez	Limoux	796
Carcassez	Carcassonne	561
Lauraguais	Castelnaudary and Lavaur	683
Velay	Le Puy	912
Gevaudan	Mende	2027
And the following dioceses:—		
Nîmes		1246
Uzès		1159
Toulouse		1090
Montpellier		707
Lodève		272
Béziers		897
Narbonne		1433
Alby		1923
Montauban (part of)		208
		16,119

We borrow the above division from the 'Statistique de la France,' printed and circulated by the minister of public works, agriculture, and commerce of that kingdom, as being the most authentic source, and as giving the extent of each territorial division. The arrangement, comprehending districts partly feudal and partly ecclesiastical, is not good The dioceses given therein extended over the following feudal districts:—

	Capital.
Le Toulousain (or county of Toulouse)	Toulouse.
L'Albigeois	Alby.
The Marquisate of Mirepoix	Mirepoix.
The County of Narbonne	Narbonne.
The County of Montpellier	Montpellier.
The Viscounty of Béziers	Béziers.
The Viscounty of Lodève	Lodève.
The Viscounty of Nîmes	Nîmes.
L'Agadez, or district of Agde	Agde.
Les Cevennes, or the County of Alais	Alais.
L'Uzégeois, or Duchy of Uzès	Uzès.

The whole of the districts of the province were sometimes arranged under the three great divisions of Haut (Upper) Languedoc, Bas (Lower) Languedoc, and Les Cevennes. Toulouse was the capital.

The name Languedoc does not appear to have come into use until the thirteenth century. Two languages, or dialects, predominated at that time in France, which took their designation from their affirmatives. The dialect which prevailed north of the Loire was called Langue d'Oil, or Langue d'Oui; that of the south of France, Langue d'Oc; otherwise the Occitanian, or Provençal language. [FRANCE.] From the dialect the name passed to the district in which it continued to be spoken. The district however had been the theatre of events and changes of considerable interest at an earlier period.

It constituted part of the Roman conquests in Gaul before the general subjugation of that country by Cæsar. The 'Provincia' of the Commentaries of that general was bounded by the Rhône, the Cévennes, and the Pyrenees. The part west of the Rhône comprehended the greater part of Languedoc. The county of Toulouse formed the western extremity of Languedoc; and Cæsar informs us that the Tolosates, who occupied that district, were just within the Roman frontier. (*Cæs de Bell. Gall.*, i., 10.) In the subsequent divisions of Romanized Gaul, Languedoc was chiefly included in the province of Narbonensis, and upon the subdivision of that province, in Narbonensis Prima. The Celtic tribes which inhabited it were: the Tectosages (about Carcassonne), the Tolosates (about Toulouse), and the Arecomici (between the Cevennes, the Rhône, and the Mediterranean, from Béziers to Uzès); these were three divisions of the Volcæ; the Atacini (on the Atax, or Aude), and a portion of the Consoranni (Couserans and Foix), the Gabali (Gevaudan), the Helvii (Vivarais), and the Vellavi (Velay). The Helvii were included in Viennensis, the Gabali and Vellavi in Aquitania Prima, which makes it probable that these tribes were not included in the 'Provincia' of the Romans before Cæsar's time. In the decline of the Roman empire the province of Narbonensis Prima was occasionally designated Septimania, from its seven dioceses of Toulouse, Béziers, Nîmes, Agde, Maguelonne (Montpellier), Lodève, and Uzès.

In the year 412, Languedoc, through which the Vandals and Alans had marched into Spain, was seized by the Visigoths under their king Ataulphus. [ATAULPHUS.] They however quitted it soon after to proceed to Spain: but upon their return from that country they received the cession from the Romans of the city and territory of Toulouse, with the parts of Aquitania west of it. They made Toulouse the capital of the kingdom which they established, the boundaries of which they soon extended to the banks of the Loire and the Rhône, comprehending the whole of Languedoc and several other provinces. The battle of Vouglé or Vouilli (A.D. 507) broke the power of the Visigoths; and Toulouse came into the power of Clovis, king of the Franks. [CLOVIS; FRANCE.] The greater part of the Narbonensis Prima of the Romans remained however to the vanquished nation, and bore under their sway the names of Gothia and Septimania; this province was under the government, in military and civil affairs, of a count or duke, an officer of the highest rank, appointed by the king of the Visigoths of Spain.

In the earlier part of the eighth century, the Saracens having conquered Spain, and put an end to the kingdom of the Visigoths, Septimania fell into a state of anarchy. It remained however in the hands of the Visigoths, and became the place of refuge for those who fled from the Sara-

cens in Spain. In the year 719 the Saracens passed the Pyrenees under Zama their general. He took Narbonne, but failed in an attempt on Toulouse, then under the sway of Eudes, the Frankish duke of Aquitaine, who defeated and slew Zama. The Saracen army in consequence withdrew into Spain. They made a second attempt, which failed; but a third endeavour was more successful: the greater part of Septimania was conquered in A.D. 725 or the following years; and the ravages, if not the permanent conquests, of the Saracens, were extended even beyond its boundaries.

Pepin le Bref in the year 752 drove the Saracens from Languedoc. He took Narbonne after a siege or blockade of seven years; and then attacking Waiffre, duke of Aquitaine, reduced Toulouse, the Albigeois or district of Albi, and Gevaudan, which were in possession of Waiffre, who had become all but independent of the Frankish crown. Under Charlemagne, Toulouse was made the seat of a count or governor, and in the reign of Louis le Debonnaire, his son, the maritime part of Languedoc was formed, with the adjacent part of Spain, into a duchy, under the name of Septimania, or Gothia. This duchy was afterwards reduced to a marquisate, and the Spanish portion (the March of Spain) was taken from it and made a separate government. The marquisate of Septimania was subsequently united with the county of Toulouse; and by this junction the counts of Toulouse became masters of nearly the whole of Languedoc; and were enabled, during the feeble reigns of the later Carlovingian and the earlier Capetian kings, to act a leading part in the south of France. They were among the six great feudatories who afterwards became exclusively peers of France, and had the right of nomination to the vacant abbeys and dioceses within their dominions. They were feudal suzerains of Rouergue, Querci Auvergne, and Velay, and were possessors of some parts of Provence. Raymond IV., count of Toulouse, was one of the princes who took part in the first Crusade. He bore the titles of count of Toulouse and Provence, duke of Narbonne and marquis of Gothia, and was one of the most powerful princes of his time. He set out, A.D. 1096, at the head of an army of his own subjects, of Gascons, and of others, under the general designation of Provençaux; and in his march through Lombardy received such accessions to his force as to swell it to the number of 100,000. His division was accompanied by Adhemar, bishop of Le Puy, the pope's legate. He marched through Friuli and Dalmatia to Constantinople, and was the only one of the leading Crusaders who refused to do homage to the emperor Alexius for their expected conquests. In the march to Jerusalem, at Nice, at Dorylæum, and at the capture of Jerusalem, Raymond highly distinguished himself; and the historians of Languedoc state that the throne of Jerusalem was offered to him and refused by him before it was conferred upon Godfrey of Bouillon; but this is at least doubtful. Placed by the emperor Alexius Comnenus at the head of a body of Latin troops, supplemental to the first Crusade, Raymond was defeated by the Turks, and afterwards made prisoner at Tarsus in Cilicia by Tancred, one of his fellow-crusaders. Having obtained his release, he took several places in Syria, and died A.D. 1105, while besieging the city of Tarabolos, or Tripoli, in Syria.

Before his departure Raymond IV. had made over the government of his hereditary dominions, which extended from the Pyrenees to the Alps, to his son Bertrand, who, having secured possession of them after a severe struggle with the duke of Aquitaine, followed his father's example, and embarked, A.D. 1109, for the Holy Land in a fleet of forty vessels, each carrying a hundred knights. He was joined on his way by ninety Genoese and Pisan vessels; and after visiting Constantinople and Antioch, formed the siege of Tripoli, which his father had attacked in vain. Having taken the place, it became the capital of a county, a feudal dependency of the Latin kingdom of Jerusalem; which county Bertrand held during his life and transmitted to his younger son Pons, in whose posterity it remained until united with the principality of Antioch.

On the death of Bertrand, A.D. 1112, he was succeeded in his European dominions by his brother Alfonse Jourdain, who had been born in Palestine, A.D. 1103, and baptized in the river Jordan, from whence he took his name. During his minority Alfonse was despoiled of the county of Toulouse by the duke of Aquitaine; but was restored by the fidelity of the people of Toulouse, who seized the opportunity of the invader's absence to throw off the yoke. The fidelity of the same people afterwards preserved the county of Toulouse from the attack of Louis VII. (le Jeune), who laid claim to it in right of his wife Eleanor of Guienne. Alfonse, following the example of his father and brother, embarked in the second crusade, A.D. 1147, for the Holy Land; and died at Acre almost immediately upon his arrival, of poison administered to him by Melisende, queen of Jerusalem.

Raymond V., who, with his brother Alfonse II. succeeded to the county of Toulouse, had to maintain a struggle with Henry II. of England; who, having married Eleanor of Guienne, urged the same claim as her former husband Louis VII., who had divorced her. Henry advanced victoriously to the walls of Toulouse; but the arrival of Louis VII., who undertook the defence of Raymond, and threw himself with a handful of men into the place, induced him to raise the siege, professedly from respect to the standard of his suzerain, the king of France. In his retreat he took Cahors, the capital of Querci, and several other places from Raymond. The war was finally terminated by a peace, one of the conditions of which was that the count of Toulouse should acknowledge Henry as his suzerain, saving the allegiance which he owed to the king of France as lord paramount. Raymond was also involved in the disputes arising from the schism of the papacy. He recognised the anti-pope Pascal, and exiled all the ecclesiastics who refused to acknowledge him: this brought his domains under an interdict from Pope Alexander III. He was afterwards reconciled to the pope, abandoning the cause of Calixtus, the anti-pope who succeeded Pascal. At a later period Raymond was again embroiled with Henry II. of England and with Richard, son of Henry, to whom his father had ceded the duchy of Guienne, or Aquitaine. Raymond terminated his unquiet life A.D. 1194.

His successor, Raymond VI., is known by the misfortunes in which his protection of the Albigeois involved him. The extensive dominions of the counts of Toulouse contained a population more advanced in intellect and civilization than the other provinces of France; the corruptions of the Romish church had excited great attention, and the heresy, as it was termed, of the Albigeois, or Albigenses, had widely spread through Languedoc. [ALBIGENSES.] Raymond V. had desired to repress it, but the troubles of his reign had prevented it. In the time of Raymond VI. the pope Innocent III. despatched legates into the infected districts, with directions to claim the aid of the secular arm in the suppression of the new tenets. Raymond shrunk from the task of extermination; and although the menaces of the legates induced him in 1205 to promise upon oath to expel the Albigenses from his dominions, he does not appear to have taken any steps to fulfil his promise; and the refusal to bind himself to it by treaty brought a papal interdict on himself and his dominions. At length he signed the treaty, but the subsequent murder of Pierre de Castelnau, one of the papal legates, by an unknown assassin, whom Raymond was charged with employing, induced the pope to proclaim a crusade against him and the Albigenses. Those who engaged in it wore the cross on the throat, in contradistinction to those who embarked for the Holy Land, who wore it on the shoulder.

The irruption of 300,000 fanatics into Languedoc alarmed Raymond, who took every means to be reconciled to the church. He made his appearance before the council of Valence, and after submitting to be scourged at St. Gilles, by Milon, the pope's legate, he obtained absolution, and even assumed the cross against his own subjects. A subsequent refusal to deliver up those inhabitants of Toulouse who were suspected of heresy drew upon him again the thunders of the Church, and he had to visit Rome to obtain absolution of the pope. But submission seems to have availed but little. The crusading host, under the guidance of Simon de Montfort, earl of Leicester, extended its conquests in Languedoc. A new refusal to submit to the requirements of the council of Arles, A.D. 1211, drew upon Raymond fresh excommunication; and being now driven to despair, he determined to stand on his defence. His nephew, Raymond Roger, count of Carcassonne, endeavoured to defend Béziers and Carcassonne, but his resistance was in vain: the capture of the former, as well as that of Lavaur in the county of Albi, was followed by frightful massacres (A.D. 1209-1211), and Raymond Roger was himself taken at Carcassonne and subsequently poisoned. The

unhappy Raymond now found himself not only abandoned but attacked by his own brother Baudouin, who joined the crusade. He was besieged in Toulouse, but a successful sortie raised the siege. His army was, however subsequently defeated at Castelnaudary, and he obtained but a short remission by the suspension of the crusade by Innocent III. The war soon broke out again; and the count of Toulouse, with his ally the king of Aragon, who fell in the combat, having suffered a dreadful defeat at Muret, the contest was terminated by his submission, and the seizure of all his domains by Simon de Montfort, to whom the county of Toulouse, properly so called, was granted by the council of Montpellier in 1215. Only a portion of his domains remained to Raymond.

The affection of the people of Toulouse for their hereditary princes enabled Raymond, before his death to recover the greater part of his dominions. He entered Toulouse A.D. 1217, and though twice besieged, first by Simon de Montfort in person, who was killed before the place, and his son Amaury de Montfort, and the second time by Louis, son of Philippe II., king of France, he maintained possession till his death, A.D. 1222.

Raymond VII., son and successor of Raymond VI., pressed Amaury de Montfort so close, that he obliged him to retire into the domains of the French king, Louis VIII., to whom he ceded his right over the conquests made by the crusaders. Raymond had now to struggle with the power of the crown; and though the death of Louis VIII. delivered him from the hostility of that prince, he was obliged to purchase peace of his successor Louis IX., A.D. 1229, by the cession of many parts of his once extensive dominions. In his time the Inquisition was established at Toulouse, to extirpate the remains of the Albigenses; but the jurisdiction of the Inquisitors was so odious that it caused a revolt of the people, who drove them from the city. Raymond incurred repeated sentences of excommunication for his real or supposed connivance at the tumults of the people. He was subsequently engaged in hostilities with Louis IX. He died A.D. 1249, and in him ended the male line of the counts of Toulouse. His states came to Alfonse, count of Poitiers, and brother of Louis IX. of France, who had married Jeanne, heiress of Raymond. Upon the death of Alfonse and Jeanne, A.D. 1271, the county of Toulouse came to Philipe III., king of France, whose successors on the throne held the county till A.D. 1361, when it was united to the crown. The remainder of Languedoc had been in great part united to the crown by the kings Louis VIII. and IX., who had obtained them by force or cession from the counts of Toulouse.

The separate history of Languedoc terminates with the extinction of the county of Toulouse: subsequent events form part of the general history of France. The heresy of the Albigenses was in appearance suppressed, but the principle of opposition to the court and doctrines of Rome was probably smothered rather than extinguished; for when the Protestants of France were at a subsequent period numerous enough to make head against the crown, Languedoc was one of the provinces in which they most abounded. Even after Protestantism had been repressed in other parts of France, the Protestants made head against the government here. [CEVENNES, LES.] The number of them in this part may be inferred from the estimate that nearly 200,000 were brought to abjure their religion by the stringent arguments of Louis XIV., beside those who emigrated to foreign countries; and even now the Protestants are tolerably numerous.

Under the monarchy Languedoc was one of the Pays d'Etats. The states consisted of the clergy, three archbishops, and twenty bishops; the noblesse, among whom the Count of Alais held the first place; and the Commons, consisting of the consuls and deputies of the episcopal and other towns. The archbishop of Narbonne was perpetual president of the states. Their chief business was to apportion among the different parts of the province the taxes levied by the king. Toulouse had a 'Parlement,' or court of justice, which acquired an odious celebrity from its unjust decision in the case of Calas in the middle of the last century.

LANGUEDOC, CANAL DE, otherwise CANAL DU MIDI. [FRANCE.]

LA'NIADÆ. [SHRIKES.]

LANIO'GERUS. [NUDIBRANCHIATA.]

LANNER. [FALCONIDÆ, vol. x., p. 181.]

LANNION, a town in the department of Côtes du Nord, in France, 313 miles west of Paris through Rennes and Guingamp. It is an ill-built town on the æstuary of the little river Guer, over which there are two bridges, uniting the town with its faubourgs or suburbs. The æstuary is navigable for vessels at high-water, and by it the town is enabled to carry on some trade in horses, wine, cider, wheat, oats, flax, hemp, and salt butter. There is a handsome quay. The population in 1836 was 5461. It is the chief town of an arrondissement containing 333 square miles, and comprehending 7 cantons, 62 communes, with a population in 1836 of 107,229.

LA'NSIUM, a genus of the natural family of Meliaceæ, established by the late Dr. Jack, and formed of the *Lansium* of Rumph, 1, p. 151, t. 54, which is the *Lansai* of Marsden's 'Sumatra,' pl. v., p. 101, and the *langsal* or *lanseh* of the natives of the Malay Islands. This forms one of the highly esteemed fruits peculiar to the Malayan Archipelago, or what was termed *India aquosa* by old writers, though unnoticed in many works where we might expect to find it fully described. The genus is characterized by—Calyx deeply 5-parted. Corol 5-petalled, petals roundish. The tube formed by the union of the stamens is subglobose, with its mouth nearly entire, having the 10 anthers included within it. Ovary 5-celled, cells with 1-2 ovules. Style short, columnar. Stigma flat 5-rayed; berry cortical, 5-celled, 5-seeded, with one or two cells only perfecting their seed. Seeds enveloped in a semitransparent pulpy tunic or aril, exalbuminous, cotyledons unequal, peltate, the short radicle being inserted into their centre. The Lanseh forms a moderate-sized tree with tomentose branches. Leaves alternate, pinnate; leaflets 7 to 9, alternate, short-pedicelled, elliptic-oblong, very smooth. The young leaves are pubescent on the under surface. Stipules none. Racemes springing from the trunk and naked branches, at first suberect, afterwards drooping by the weight of the fruit. The fruit is of an agreeable taste, according to Marsden, though the skin contains a colouring juice, extremely bitter, and which is apt to taint the fruit if not opened with care.

The Ayer Ayer is another fruit so nearly resembling the Lanseh in most particulars that Dr. Jack, hesitating to rank it as a species, mentions it as a permanent and well-marked variety, under the name var. β, L. aqueum. The fruit of the Ayer Ayer is rounder and the pulp more watery and dissolves more completely in the mouth than the Lanseh. Both are highly esteemed by the Malays, and are equally agreeable to the European palate. The juicy envelope of the seeds is the part eaten, and the taste is cooling and pleasant. (*Lin. Transact.*, xiv., p. 114.)

LANTA'NA, a genus of plants of the natural family of Verbenaceæ, named from one of the old names of Viburnum, which some of the species somewhat resemble in habit. They are often stated to be confined to America, but a species is found in Arabia, and two in India. They form small or moderate sized shrubs, often with rugose aromatic leaves, and a somewhat peculiar odour in the clustered flowers, which are either pink, yellow, white, or changeable. Piso states that three species, which are confounded together in Brazil under the name *Camara*, are there used for making medicated baths for diseases of the skin. Martius states that the flowers of some species are employed for making demulcent drinks in catarrhal affections. *L. macrophylla* is employed in infusions as a stimulant, and *L. pseudo Thea* as a substitute for tea.

LANTIER, E'TIENNE FRANÇOIS DE, born at Marseille, September 1, 1734, although passionately attached to literature, did not appear as an author till 1778, when his comedy of the 'L'Impatient' was performed after having been retained in manuscript for three years. Notwithstanding the very sinister predictions of some of his friends, the pièce had a decided success; and thus encouraged, Lantier published his 'Tales,' in prose and verse, which latter La Harpe pronounced to be inferior only to those of Voltaire and Lafontaine. On his return from a journey to Italy, he was admitted into the academy of Marseille, (1786), and began collecting materials for his celebrated 'Voyages d'Anténor,' the idea of which had been suggested to him by his visit to Herculaneum. The success of this work, composed amid the storms of the Revolution, was almost unprecedented. Some critics would fain have persuaded the public that this delightful production was merely a feeble imitation of Barthélemy's 'Anacharsis,' although

Lantier had purposely abstained from reading the latter work until he had completed his own. In fact, although resembling each other in their general scope, the two works are very dissimilar in character and style, and in their respective merits. One proof of its popularity is, that 'Anténor' has been translated into German, Italian, Spanish, Portuguese, Russian, and modern Greek. He afterwards produced two other fictitious narratives of travels, 'Les Voyageurs en Suisse,' and 'Le Voyage en Espagne,' both of which possess considerable interest; also his 'Correspondance de Cézarine d'Arly,' a work captivating for the graces of its tone and style, and almost a literary prodigy when considered as the production of an octogenarian. Even ninety-one years had not extinguished his literary ardour, for at that very advanced age he composed a poem in eight cantos, entitled 'Geoffroy Rudel, ou le Troubadour.' He died at Marseille, where he had resided for the last twelve years, January 31, 1826, at the age of 92.

LANZI, LUIGI, an eminent modern Italian archæologist and writer on art, was born in the Marca d'Ancona, on the 14th of June, 1732. After receiving an excellent education at home, he entered the order of the Jesuits at the age of seventeen, and as soon as he had completed his own studies, which were directed chiefly to classical literature, distinguished himself as a zealous and able instructor of youth. Afflicting as the event was to him at the time, and it occasioned him a serious illness, the suppression of the order may be considered to have been a most fortunate one for Lanzi's reputation, since it threw him into a literary career which he would else probably not have entered. The first step towards it was his being appointed antiquarian, or keeper of the cabinet of medals, at Florence, by the grand-duke Peter Leopold, April 17th, 1775. One of his first literary productions was his 'Descrizione della Galleria,' which, greatly superior to the generality of productions of the same class, afforded proof of critical acumen and erudition. To this succeeded his dissertation on the sculpture of the antients, entitled 'Notizie Preliminari,' &c., 1789, and the celebrated 'Saggio di Lingua Etrusca,' a work of extraordinary study and research, which throws considerable light on a very obscure and difficult branch of archæology. Yet notwithstanding its intrinsic value it was from its nature calculated to interest only a small portion even of the learned world, and has therefore contributed less towards its author's fame with the European public than his 'Storia Pittorica.' This latter work, the first portion of which appeared in 1792, and to undertake which he had been excited by Tiraboschi, the historian of Italian literature, was the first attempt to give a comprehensive and continuous history of Italian painting, arranged according to schools and epochs, and written in a tone of impartial criticism; whereas prior to its appearance the numerous particular histories and artistical biographies presented little better than a confused mass of materials, and conflicting prejudices and opinions. Lanzi's object was to characterize all the various schools, and the chief masters in each, and also the changes in regard to style and taste which each had undergone; while the utility of the work as a book of reference is greatly increased by three excellent indexes. Hardly had its author completed the publication of the 'Storia Pittorica,' when the battle of Bassano, September 8th, 1796, drove him from that city, and compelled him to seek an asylum in Treviso, and afterwards in Udine, where he remained till the latter part of 1801, when he returned to Florence, having been restored to his former appointment in the museum. Here he wrote his three dissertations on the so-called Etruscan vases, and made a collection of lapidary inscriptions, but suffering from repeated apoplectic attacks and the infirmities of age, it was not until earnestly pressed by Cardinal Zondadari, archbishop of Sienna, that he prevailed upon himself to publish the latter, adding to them his own Latin poems, which are remarkable for their purity and graces of style. In addition to the above, and one or two minor productions, Lanzi published a translation of Hesiod in terza rima, first undertaken by him in his youth, and carefully corrected and touched up by him from time to time. His death was occasioned by apoplexy, March 30, 1810.

LAO'COON, according to antient fable, was the son of Priam (according to others, of Antenor), and a priest of Apollo during the Trojan war. While offering, in the exercise of his office, a bullock to render Neptune propitious to the Trojans, two enormous serpents issued from the sea, and, having first destroyed his two sons, whom he vainly endeavoured to save, attacked Laocoon himself, and, winding themselves round his body, crushed him to death in their folds. This dreadful punishment was inflicted by the goddess Minerva for the part Laocoon had taken in endeavouring to dissuade the Trojans from admitting into Troy the famous, and, as it afterwards proved to them, fatal wooden horse, which the crafty Greeks had consecrated to Minerva.

An enduring celebrity has been gained for this story from its forming the subject of one of the most remarkable groups in sculpture which time has spared to us. It represents the agonised father and his youthful sons, one on each side of him, writhing and expiring in the complicated folds of the serpents. The figures are naked, the drapery that is introduced being only used to support and fill up the composition. This superb work of art, which Pliny describes inaccurately as consisting of only a single block of marble (for in spite of this mistake there seems to be no doubt in the opinion of the learned that this is the identical group alluded to by that writer), originally decorated the baths of Titus, among the ruins of which it was found in the year 1506. The names of the sculptors who executed it are also recorded. They are Agesander, Polydorus, and Athenodorus, natives of Rhodes. Pliny (xxxvi. 5) says, 'Laocoon, which is in the house or palace (*domo*) of the emperor Titus, is a work to be preferred to all others either in painting or sculpture. Those great artists Agesander, and Polydorus, and Athenodorus, Rhodians, executed the principal figure (*eum*), and the sons, and the wonderful folds of the serpents, out of one block of marble.'

There has been much difference of opinion among antiquaries on several points connected with this group: first, as to the date of the artists; Winckelmann contending that they are of a good period of Greek art, and as early as Lysippus. A considerably later date is now however attributed to them; and the next question discussed has been, whether the sculptor was indebted for the subject to Virgil's fine description (*Æneid*, ii., v. 200), or whether the poet was indebted to the artist. With respect to date, the most careful consideration seems to fix these sculptors as late as the early emperors; and Lessing, whose work on the Laocoon deserves the attention of all who take an interest in the philosophy and capabilities of art, believes they lived in the reign of Titus. With regard to the subject, it is most probable that the story, being well known, offered advantages for illustration to the sculptor, as it did for description to the poet. As Virgil's priest was habited in his robes during the exercise of his priestly functions, and the group under consideration is entirely naked, the argument is additionally strengthened against the assumption that the artist borrowed from the poet. It is more natural to believe that each drew from a common source, and treated the subject in the way best adapted to the different arts they exercised; the sculptor's object being concentration of effect, the poet's amplification and brilliant description.

This group is justly considered, by all competent judges, to be a masterpiece of art. It combines, in its class, all that sculpture requires, and, we may say, admits of, and may truly be studied as a canon. The subject is of the most affecting and interesting kind; and the expression in every part of the figures reaches, but does not exceed, the limits of propriety. Intense mental suffering is portrayed in the countenances, while the physical strength of all the three figures is evidently sinking under the irresistible power of the huge reptiles wreathed around their exhausted limbs. One son, in whose side a serpent has fixed his deadly fangs, seems to be fainting; the other, not yet bitten, tries (and the futility of the attempt is faithfully shown) to disengage one foot from the serpent's embrace. The father, Laocoon himself, is mighty in his suffering: every muscle is in extreme action, and his hands and feet are convulsed with painful energy. Yet there is nothing frightful, disgusting, or contrary to beauty in the countenance. Suffering is faithfully and strongly depicted there, but it is rather the exhibition of mental anguish than of the ugly and undignified contortions of mere physical pain. The whole of this figure displays the most intimate knowledge of anatomy and of outward form; the latter selected with care, and freed from any vulgarity of common individual nature: indeed the single figure of Laocoon may be fairly referred to as one of the finest specimens existing of that combination

of truth and beauty which is so essential to the production of perfect sculpture, and which can alone insure for it lasting admiration. The youths are of a smaller standard than the proportion of the father: a liberty hardly justifiable, but taken probably with the view of heightening the effect of the principal figure. The right arm of the figure of Laocoon is a restoration. Some have thought that the original action was not extended, but that this arm was bent back towards the head; and have supported their hypothesis by the fact of there being a rough and broken surface where they think the hand, or perhaps a fold of the serpent, may have come in contact with the hair.

It has been stated that the group was found in Rome in the year 1506. There is a curious letter, not generally known, but published by the Abbate Fea, from Francesco da San Gallo to Monsignore Spedalongo, dated 1567, in which the circumstances of the discovery are alluded to. He says, 'It being told to the Pope that some fine statues were found in a vineyard near S. Maria Maggiore, he sent to desire Giovanni da San Gallo (the father of the writer) to go and examine them—that Michel Angelo Bonarotti being often in their house, San Gallo got him to go also; and so,' says Francesco, 'I mounted behind my father (*in groppa a mio padre*), and we went. We descended to where the statues were; my father immediately exclaimed, "This is the Laocoon spoken of by Pliny." They made them enlarge the aperture or excavation so as to be able to draw them out, and then, having seen them, we returned home to dinner.' The group of 'Laocoon and his Sons' is now preserved among the treasures in art in the museum of the Vatican at Rome.

LAOMEDE'A, a genus of Polyparia, established by Lamouroux to include species ranked by previous writers of Sertularia. [SERTULARIDÆ.]

LAON, a town in France, capital of the department of Aisne, 82 miles from Paris on the high-road by Avesnes and Maubeuge to Mons and Brussels. It is situated on a steep isolated hill about 300 feet high, which commands on every side an extensive view over the surrounding flat country. It is said to have taken its origin, in the reign of Clovis, from a castle which stood on this eminence. In the later period of the Carlovingian dynasty it was frequently the residence of the kings of France, and it continued throughout a part of the domain of the crown. It was before the Revolution the see of a bishop, a suffragan of the archbishop of Reims. The town consists of one principal street, rather narrow, and several smaller streets very narrow: it is surrounded by an antient wall, flanked with towers, and by a boulevard, or public walk, on the brow of the hill. At the foot of the hill are the suburbs. The population in 1836 amounted to 8320. The cathedral is a beautiful Gothic building with four towers, and there are five other churches. There are a seminary for the priesthood, a community of the Sœurs Gris, two hospitals, one of them for foundlings, and a poor-house. There are handsome barracks and a theatre. In the suburbs are potteries and tan-yards, lime-kilns, a ropewalk, and a manufactory of copperas. The neighbourhood produces grain and wine, and many artichokes are grown for the supply of Paris. There are a high-school, with a museum of natural history attached, a public library of 12,000 vols., and a drawing-school.

Laon was besieged in the civil contests of the Armagnacs and Bourguignons, and was taken from the League by Henri IV. in 1594. In 1814 it was the scene of a severe action between the French and the Prussians and other allies.

The arrondissement of Laon contains 948 square miles, and comprehends 11 cantons and 289 communes, with a population in 1831 of 164,114.

LAOS, the country of the Laos, or Lowas, comprehends the central portions of the peninsula without the Ganges, lying between 15° and 24° N. lat., and 96° and 103° E. long. It borders on the south on Siam and Cochin China, on the east on the last-mentioned country, on the north on China, on the north-west and west on the Birman empire. Its south-western corner is contiguous to the British province of Martaban, which was taken in 1826 from the Burmese. According to the calculation of Berghaus, its area covers 130,000 square miles, or about 18,000 square miles more than the British empire.

Being surrounded on all sides by countries whose governments have always shown a great degree of jealousy towards foreigners, our knowledge of this country is very scanty and unsatisfactory. The western portion of it, extending along the banks of the Saluen river, which divides Laos from Birma, is covered with mountain-ranges, which do not attain the snow-line, but rise in some parts to a considerable height, as the thermometer was observed to stand at 46° at eight o'clock in the morning. This mountain-region seems to extend over the whole country north of 20° N. lat.: it is intersected by wide level tracts and plains along the courses of the rivers, which are of great fertility, but low, and subject to frequent and extensive inundations. The south-eastern part, which is traversed by the river Maekhaun, or the river Camboja, seems to contain more level land than the rest of the country; but this opinion is only a supposition, as this part of the country has never been visited by Europeans. Along the eastern border of Laos there runs a mountain-range, about 100 miles wide, which separates it from Cochin China and Tonkin. It rises to a considerable height, but the elevation has never been determined. The greatest part of the country is covered with forests, and swamps or stagnant waters, which are produced by the inundations of the numerous rivers which descend from the high ranges surrounding the elevated table-land of Yunnan in China.

The largest of its numerous rivers are the Saluen [BIRMA, iv., 438], the Maekhaun [COCHIN CHINA, vii., 307], and the Menam, or river of Siam, which flows through the centre of the country between the two first-named rivers. It rises on the western declivity of the table-land of Yunnan, in two branches: the Mae-ghue, the western; and the Mae-praen, the eastern. They unite south of 22° N. lat., and the rivers, after their junction, preserve the name of Mae-praen, and also their southern direction. Where the Mae-praen approaches the boundary of Siam (near 18° N. lat.), its name is changed into that of Menam, under which it is known up to its mouth in the Gulf of Siam. It seems almost certain that a natural water communication exists between this river and its more eastern neighbour, the Maekhaun. At about 20° N. lat., the Maekhaun divides into two branches; of which the western, called Anan, runs south-south-west until it joins the Mae-praen, south of 19° N. lat. This natural canal is said to be navigable for river barges. The whole course of the river Menam probably exceeds 800 miles, and it is navigable for the greatest part of its course, though several rapids occur in it.

We have no account of the climate of Laos, but as it is observed that rice is the principal grain cultivated, and that no wheat is grown, we may consider that the lower portions do not materially differ in climate from Bengal. All fruits which grow in Southern Asia succeed, with one or two exceptions, and some of them are sent to the neighbouring countries, as oranges to Ava. Cotton is cultivated to a great extent, and much silk is collected, as well as lac-gum. Among the wild animals the elephant and rhinoceros are abundant. Cattle and buffaloes abound. In some of the northern districts the tea plantations are very extensive: the leaves of the plant are not dried, but salted for chewing, for which purpose they are used in many of the neighbouring countries. The mountainous parts, and especially those districts which are contiguous to Yun-nan, are very rich in metals. Gold abounds in many rivers, and silver-mines are worked to a great extent by Chinese miners. Copper occurs in many places, and tin in a few. Iron-ore is found farther south in the country, on the banks of the Saluen river, and the natives make good fire-arms. Rock-salt also occurs in these parts.

The inhabitants of Laos seem to be the original stock of a nation which is widely dispersed over the peninsula without the Ganges, to the east of the river Saluen. They resemble the inhabitants of Siam and Camboja in the form of their bodies and in language. Their language differs so little from the Siamese, that it can only be considered as a dialect of it. All the nations belonging to this stock are called Shan, which by Europeans has been changed into Siam. The inhabitants of Laos are distinguished among themselves by the names of Lan-pung-kau (white Laos) and Lan-pung-dam (black Laos), of whom the former seem to inhabit the more mountainous and elevated parts of the country, and the latter the plains. According to Gutzlaff they are inferior in civilization to the Siamese, except those who inhabit the southern districts of Yun-nan, and who have adopted the arts of the Chinese. Yet even the rest seem to have made considerable progress in agriculture, horticulture, and the various arts of civilized life. They are

Buddhists, and their sacred books are written in the Pali language. Though they have a national literature, they are not very anxious to study it. Their best books treat of the common occurrences of life, in prose.

Laos is divided into three great portions. The most northern, between the Saluen and Mae-praen, is called Upper Laos, or the country of the Lowa-Shan; its capital is Kemalatain. South of it lies Lactho, or the country of the Yun-Shan, with the capital Zaenmae, or Changmai. The south-eastern part is called Lanchang, or the country of the Shan. It is nearly unknown to Europeans, and its capital is said to be Lanchang, or Zandapuri. To these three great divisions is to be added Tarout, which lies north of Lanchang, and seems to be incorporated partly with Yun-nan and partly with Tonkin. It is also inhabited by the Shans.

Though this country in former times appears to have been a powerful and independent state, it has generally been subject to the neighbouring countries in modern times. Towards the end of the last century, the dominion of the Birmans seems to have extended over nearly the whole of this country, but since that time the greatest part has recovered its independence. But as it is governed by a great number of petty hereditary sovereigns, it has been unable to preserve its independence, and in modern times the southern districts seem to have fallen under the dominion of the Siamese government. Whether or not the king of Cochin China exercises any authority over Lanchang is not positively known, but it is probable that he does.

Laos seems to carry on an active trade with Siam, Birma, and China. It exports to Siam musk, gold, lac, slaves, ivory, rhinoceros horns, benzoin, hides and tiger skins, silk and silk stuffs, precious stones, and salt. Its commerce with Ava, the capital of Birma, is almost exclusively limited to that town, and Kemalatain, the capital of the Lowa-Shan. The merchandise is transported over high mountains on carts drawn by buffaloes. Laos exports to Birma cattle, gold, silver, precious stones, and fruits, and receives in return iron-ware, yellow and red sandal wood, cotton cloth, chintzes, and terra-japonica, opium, and other articles procured from Hindustan. The road which leads to Yun-nan appears also to cross the town of Kemalatain, and thence to ascend to the table-land of south-western China. The commerce between these countries seems to be very active, in spite of the numerous obstacles presented by a road leading over several mountain-ridges. The merchants of Laos export gold, precious stones, silver, tin, lead, common and red sulphur, cotton wool and yarn, salted tea, lac, sapan wood, brasilleto, and an officinal root, called cothua-boua. The Chinese bring to Laos musk, chowry-tails, and various other articles, raw and manufactured.

(Francis Hamilton, in the *Edinburgh Philos. Journal*; Crawfurd's *Embassy to the Court of Ava*; Gutzlaff, in the *Journal of the London Geogr. Society*, vol. iii.; and Richardson, in the *Asiatic Journal*; Berghaus, *Map* and *Memoirs*.)

LAPIS LA'ZULI. [LAZULITE.]

LA'PITHÆ. [CENTAURS.]

LAPLACE, PIERRE SIMON. A life of Laplace can hold no middle place between a short account for the general reader, and a detailed description of his labours for the reference of those who read his works. Independently of the latter being too long for this work, we have a specific reason for avoiding it, which will appear in the course of this article: namely, that the writings of Laplace do not give specific information as to what was done by himself and what by others; and that no one has yet supplied the deficiency. The few facts connected with his personal life are drawn from the éloge of Fourier, or from the 'Biographie des Contemporains.'

Pierre Simon Laplace was born, March, 1749, at Beaumont-en-Auge, near Honfleur, and was the son of a farmer. He received a good education, and appears at first to have turned his attention to theology; but as early as the age of eighteen he went to Paris, having previously taught mathematics at his native place. He had letters of introduction to D'Alembert, but finding that they procured him no notice from that philosopher, he wrote him a letter on some elementary points of mechanics, with which D'Alembert was so much pleased that he sent for Laplace the same day, telling him that he had found a better way of calling attention to his claims than by letters of introduction. Very shortly afterwards the recommendation of D'Alembert procured for Laplace a chair of mathematics at the military school of Paris. This took place in 1768 or 1769; in 1772 Laplace showed his powers in a paper on integration of equations of finite differences in the Memoirs of the Academy of Turin; and from that time his scientific life was one atchievement after another, until he attained a reputation almost Newtonian with the world at large, and of the highest extent and character among mathematicians, who, though they cannot even compare walks of so different a kind as those of Newton and Laplace, feel that the latter must be named next after Lagrange, and the two together above all the followers of the first.

The political life of Laplace was not so favourably distinguished. In 1799 the First Consul made him minister of the interior. With the views which Napoleon always professed with respect to science, it is not wonderful that he should have made the experiment of trying to strengthen his administration by the assistance of a philosopher whose rising fame made the French expect to claim a name which should rival that of Newton. But the experiment was not successful; and after a very short period the First Consul removed Laplace to the head of the sénat conservateur. The subsequent account given by Napoleon of his minister will be a part of the biography of Laplace in all time to come. 'A mathematician of the highest rank, he lost not a moment in showing himself below mediocrity as a minister. In his very first attempt at business the consuls saw that they had made a mistake. Laplace looked at no question in its true point of view. He was always searching after subtleties; all his ideas were problems, and he carried the spirit of the infinitesimal calculus into the management of business.' This pointed satire is not, we suspect, one of which the force will be always admitted; first, because it is so very like what a satirist ought to say of a mathematician; secondly, because the character of Laplace's mathematical writings is signally and ridiculously the opposite of all the preceding, as we shall presently notice. That Laplace was an incompetent minister is probable; but this is not the worst.

In 1814 he voted for the deposition of his benefactor, a step which might have been justifiable on public grounds: but nothing can excuse the suppression of the dedication to Napoleon, which stood at the front of his 'Théorie des Probabilités' during the prosperity of his benefactor, and no longer. Laplace, who had been created a count by Napoleon, and a marquis by Louis XVIII. immediately after the Restoration, did not appear at court during the short restoration of the former. Of his political conduct during the Revolution we have no account, except that he was at one time under the suspicion of the authorities, and was removed from the commission of weights and measures.

Any account of such a man as Laplace, written so short a time after his death, and in another country, must be looked upon as provisional. In giving all we know, we desire our readers to remember that no authentic Life of him has issued from the French press, except only the professed éloge of Fourier. If by stating those impressions as to his character which have been made upon many in this country, we should in any way be instrumental in inducing those who best knew him to destroy the basis on which they are formed, we shall do service to his reputation; but if that basis cannot be destroyed, we are only doing the duty of biographers. We say then, that in the suppression of the dedication, which we now cite entire, and which appeared in 1812, and not in 1814, there is a *primâ facie* appearance of ingratitude and pusillanimity, the evidence of which, if not answered, should be perpetuated.

'A Napoléon-le-Grand. — Sire, La bienveillance avec laquelle V.M. a daigné accueillir l'hommage de mon traité de Mécanique Céleste, m'a inspiré le désir de lui dédier cet ouvrage sur le calcul des Probabilités. Ce calcul délicat s'étend aux questions les plus importantes de la vie, qui ne sont en effet pour la plupart que des problêmes de probabilité. Il doit sur ce rapport intéresser V.M., dont le génie sait si bien apprécier et si dignement encourager tout ce qui peut contribuer au progrès des lumières et de la prospérité publique. J'ose la supplier d'agréer ce nouvel hommage dicté par la plus vive reconnaissance, et par les sentimens profonds de l'admiration et de respect avec lesquels je suis, Sire, de V.M. le très humble et très obéissant serviteur et fidèle sujet, *Laplace*.'

As if to make such a suppression as striking as possible, Laplace had said, ten years before, in the dedication of the third volume of the 'Mécanique Céleste,' to the First Con

sul, 'Puisse cet ouvrage, consacré à la plus sublime des sciences naturelles, être un *monument durable* de la reconnaissance que votre accueil et les bienfaits du gouvernement inspirent a ceux qui les cultivent. *De toutes les vérités qu'il renferme*, l'expression de ce sentiment sera toujours pour moi la plus précieuse.' Laplace did not live to publish the second edition of the 'Mécanique Céleste.'

After the final Restoration Laplace's only public employments were of a scientific character, and he died on the 5th of May, 1827. His last words were, 'Ce que nous connaissons est peu de chose; ce que nous ignorons est immense.'

'The Author of the Mécanique Céleste, to use a common synonyme for Laplace, must be an object of the admiration of posterity as long as any record of the eighteenth century exists. With the exception of some experiments made in conjunction with Lavoisier, to determine the quantity of heat in different bodies, we do not find that Laplace was employed in actual experiment. But for many years he was the head, though not the hand, of European astronomy; and most of the labours of observation were made in directions pointed out by him, or for the furtherance of his discoveries in the consequences of the law of gravitation. Before however we begin to speak of them, there is an important caution, for the want of which a reader of the Mécanique Céleste' might even overrate Laplace, great as he is.

The French school of writers on mathematical subjects has for a long time been wedded to the reprehensible habit of omitting all notice of their predecessors, and Laplace is the most striking instance of this practice, which he carried to the utmost extent. In that part of the 'Mécanique Céleste' in which he revels in the results of Lagrange, there is no mention of the name of the latter. The reader who has studied the works of preceding writers will find him, in the 'Théorie des Probabilités,' anticipated by De Moivre, James Bernouilli, &c., on certain points. But there is not a hint that any one had previously given those results from which perhaps his sagacity led him to his own more general method. The reader of the 'Mécanique Céleste' will find that, for any thing he can see to the contrary, Euler, Clairaut, D'Alembert, and above all Lagrange, need never have existed. The reader of the 'Système du Monde' finds Laplace referring to himself in almost every page, while now and then, perhaps not twenty times in all, his predecessors in theory are mentioned with a scanty reference to what they have done; while the names of observers, between whom and himself there could be no rivalry, occur in many places. To such an absurd pitch is this suppression carried, that even Taylor's name is not mentioned in connexion with his celebrated theorem; but Laplace gravely informs his readers, 'Nous donnerons quelques théorèmes généraux qui nous seront utiles dans la suite,' those general theorems being known all over Europe by the names of Maclaurin, Taylor, and Lagrange. And even in his Theory of Probabilities *Lagrange's theorem* is only 'la formule (p) du numéro 21 du second livre de la Mécanique Céleste. It is true that at the end of the Mécanique Céleste he gives historical accounts, in a condensed form, of the discoveries of others; but these accounts never in any one instance answer the question—Which pages of the preceding part of the work contain the original matter of Laplace, and in which is he only following the track of his predecessor?

The consequence is, that a student who has followed the writings of Laplace with that admiration which they must command, is staggered when he comes afterwards to find that in almost every part of the work there are important steps which do not belong to Laplace at all. He is then apt to imagine that when he reads more extensively he shall find himself obliged to restore more and more to the right owner, until nothing is left which can make a reputation such as is that of Laplace with the world at large. Such an impression would be wholly incorrect; but it would be no more than the just reward of the practice of suppression. Nevertheless the researches on the figure of the planets in the 'Mécanique Céleste,' and the general method of the 'Théorie des Probabilités' for the approximation to the values of definite integrals, are alone sufficient, when all needful restoration has been made, to enable us to say, that Laplace was one of the greatest of mathematicians.

The two first volumes of the 'Mecanique Céleste' appeared in the year VII. of the Republic (which lasted from the 22nd of September, 1798, to the 21st of September, 1799), and may have been the inducement of the First Consul to make Laplace a member of the government. The third volume appeared in 1802, the fourth in 1805, and the fifth in 1825. One posthumous Supplement has appeared. The headings of the chapters throughout will be a more useful appendage to an article in a work of reference than any account which we could find room for, especially with regard to a philosopher whose discoveries are, like those of Newton, dwelt on in every popular work.

In vol. i. are found—

Book I. *On the General Laws of Equilibrium and Motion.*

Chapter 1. On the Equilibrium and Composition of Forces which act on a Material Point.

Chapter 2. On the Motion of a Material Point.

Chapter 3. On the Equilibrium of a System of Bodies.

Chapter 4. On the Equilibrium of Fluids.

Chapter 5. General Principles of the Motion of a System of Bodies.

Chapter 6. On the Laws of Motion of a System of Bodies, for all Relations between the Force and Velocity which are mathematically possible.

Chapter 7. On the Motion of a Solid Body of any Figure.

Chapter 8. On the Motion of Fluids.

Book II. *On the Law of Universal Gravitation, and on the Motion of the Centres of Gravity of the Heavenly Bodies.*

Chapter 1. On the Law of Universal Gravitation, collected from Phenomena.

Chapter 2. On the Differential Equations of the Motion of a System of Bodies acting on each other by their mutual Attraction.

Chapter 3. First Approximation to the Celestial Motions, or Theory of the Elliptic Motion.

Chapter 4. Determination of the Elements of the Elliptic Motion.

Chapter 5. General Methods for determining the Motions of the Heavenly Bodies by successive Approximation.

Chapter 6. Second Approximation to the Celestial Motions, or Theory of their Perturbations.

Chapter 7. On the Secular Inequalities of the Celestial Motions.

Chapter 8. Second method of Approximation to the Celestial Motions (by the Variation of Elements).

In vol. ii. are contained—

Book III. *On the Figure of the Celestial Bodies.*

Chapter 1. On the Attraction of Homogeneous Spheroids, terminated by surfaces of the second order.

Chapter 2. Development of the Attraction of all Spheroids in Series.

Chapter 3. On the Figure of Equilibrium of a Homogeneous Fluid Mass which has a Rotatory Motion.

Chapter 4. On the Figure of a Spheroid which differs little from a Sphere, and is covered by a stratum of fluid in equilibrio.

Chapter 5. Comparison of the preceding theory with observation.

Chapter 6. On the Figure of Saturn's Ring.

Chapter 7. On the Figure of the Atmospheres of the Heavenly Bodies.

Book IV. *On the Oscillations of the Sea and the Atmosphere.*

Chapter 1. Theory of the Ebb and Flow of the Sea.

Chapter 2. On the Stability of the Equilibrium of the Sea.

Chapter 3. On the method of taking into account, in the Theory of the Tides, the various circumstances peculiar to each port.

Chapter 4. Comparison of the preceding theory with observation.

Book V. *On the Motion of the Celestial Bodies about their Centres of Gravity.*

Chapter 1. On the Motion of the Earth about its Centre of Gravity.

Chapter 2. On the Motion of the Moon about its Centre of Gravity.

Chapter 3. On the Motion of the Rings of Saturn about their Centres of Gravity.

In vol. iii. are contained—

Book VI. *Particular Theories of the Planets.*

Chapter 1. Formulæ for the Planetary Inequalities depending on the squares and higher powers of the Excentricities and Inclinations of the Orbits.

Chapter 2. Inequalities depending on the Square of the Disturbing Force.
Chapter 3. Perturbations due to the Ellipticity of the Sun.
Chapter 4. Perturbations of the Motion of the Planets, arising from the action of their Satellites.
Chapter 5. Considerations on the Elliptic part of the Radius Vector.
Chapter 6. Numerical values of the quantities contained in the expressions for the Planetary Inequalities.
Chapter 7. Numerical expressions for the Secular Variations of the Elements.
Chapter 8. Theory of Mercury.
Chapter 9. Theory of Venus.
Chapter 10. Theory of the Motion of the Earth.
Chapter 11. Theory of Mars.
Chapter 12. Theory of Jupiter.
Chapter 13. Theory of Saturn.
Chapter 14. Theory of Uranus.
Chapter 15. On some equations of condition which exist between the Planetary Inequalities, and which serve to verify them.
Chapter 16. On the Masses of the Planets and the Moon.
Chapter 17. On the Formation of Astronomical Tables, and on the Invariable Plane of the Planetary System.
Chapter 18. On the Action of the Stars upon the Planetary System.

Book VII. *Theory of the Moon.*

General considerations not arranged as a chapter.
Chapter 1. Integration of the Differential Equations of the Lunar Motion.
Chapter 2. On the Lunar Inequalities due to the Non-sphericity of the Earth and Moon.
Chapter 3. On the Lunar Inequalities due to the Action of the Planets.
Chapter 4. Comparison of the preceding theory with observation.
Chapter 5. On an Inequality of long period which appears to exist in the Lunar Motion.
Chapter 6. On the Secular Variations in the Motion of the Moon and the Earth, which may be produced by the resistance of an Ethereal Fluid.

In vol. iv. are contained—

Book VIII. *Theory of the Satellites of Jupiter, Saturn, and Uranus.*

Chapter 1. Equations of Motion of the Satellites of Jupiter, taking into consideration their Mutual Attractions, that of the Sun, and that of the Oblate Spheroid of Jupiter.
Chapter 2. On the Inequalities of the Motion of Jupiter's Satellites, independent of the Excentricities and Inclinations of the Orbits.
Chapter 3. On the Inequalities of the Motion of the Satellites, depending on the Excentricities of the Orbits.
Chapter 4. On the Inequalities of the Motion of the Satellites in Latitude.
Chapter 5. On the Inequalities depending on the Squares and Products of the Excentricities and Inclinations of the Orbits.
Chapter 6. On the Inequalities depending on the Square of the Disturbing Force.
Chapter 6, the second (misprint). Numerical values of the preceding Inequalities.
Chapter 7. On the Duration of the Eclipses of the Satellites.
Chapter 8. Determination of the Masses of the Satellites, and of the Oblateness of Jupiter.
Chapter 9. On the Excentricities and Inclinations of the Orbits of the Satellites.
Chapter 10. On the Libration of the Three First Satellites of Jupiter.
Chapter 11. Theory of the Fourth Satellite.
Chapter 12. Theory of the Third Satellite.
Chapter 13. Theory of the Second Satellite.
Chapter 14. Theory of the First Satellite.
Chapter 15. On the Duration of the Eclipses of the Satellites, containing the comparison with observation.
Chapter 16. On the Satellites of Saturn.
Chapter 17. On the Satellites of Uranus.

Book IX. *Theory of Comets.*

Chapter 1. Theory of the Perturbation of Comets.
Chapter 2. On the Perturbations of a Comet when it approaches very near a Planet.
Chapter 3. On the Action of Comets on Planets, and on the Masses of Comets.

Book X. *On Various Points of the System of the Universe.*

Chapter 1 On Astronomical Refraction.
Chapter 2. On Terrestrial Refraction.
Chapter 3. On the Extinction of the Light of Stars by the Atmosphere, and on the Atmosphere of the Sun.
Chapter 4. On the Measurement of Altitudes by the Barometer.
Chapter 5. On the Descent of Bodies which fall from a great height.
Chapter 6. On some cases in which the Motion of several Attracting Bodies can be rigorously obtained.
Chapter 7. On the Alterations which the Motion of Planets or Comets may undergo by the resistance of the media which they traverse, and by the gradual transmission of gravity.
Chapter 8. Supplement to the Theories of Jupiter, Saturn, and the Moon.
Chapter 9. On the Masses of the Planets and Satellites, and on Astronomical Tables.

Supplement to Book X. *On Capillary Attraction.*

Section 1. Theory of Capillary Attraction.
Section 2. Comparison with experiment.

In vol. v. are contained—

Book XI. *On the Figure and Rotation of the Earth.*

Chapter 1. Historical Notice.
Chapter 2. On the Figure of the Earth.
Chapter 3. On the Axis of Rotation of the Earth.
Chapter 4. On the Temperature of the Earth, and on the Diminution of the Length of the Day by its cooling.

Book XII. *On the Attraction and Repulsion of Spheres, and on the Laws of Equilibrium and Motion of Elastic Fluids.*

Chapter 1. Historical Notice.
Chapter 2. On the Attraction of Spheres, and the Repulsion of Elastic Fluids.
Chapter 3. On the Velocity of Sound, the Motion of Elastic Fluids, and on Aqueous Vapour.

Book XIII. *On the Oscillations of the Fluids which cover the Planets.*

Chapter 1. Historical Notice, especially on the Tides.
Chapter 2. New Researches on the Tides.
Chapter 3. Comparison with observations, as to the Heights of Tides.
Chapter 4. Comparison with observations, as to the Times and Intervals of High Water.
Chapter 5. On the Partial Tides of which the period is about a day.
Chapter 6. On the Partial Tides which depend on the fourth inverse power of the Moon's Distance.
Chapter 7. On the Tides of the Atmosphere.

Book XIV. *On the Motion of the Celestial Bodies about their Centres of Gravity.*

Chapter 1. Historical Notice of and Formulæ on the Precession of the Equinoxes.
Chapter 2. Historical Notice of and Remarks on the Libration of the Moon.
Chapter 3. Historical Notice of the Ring of Saturn.

Book XV. *On the Motion of the Planets and Comets.*

Chapter 1. Historical Notice.
Chapter 2. Considerations supplemental to the second book; on the Variation of Elements; on the Development of the Mutual Distance of Two Planets; on the Great Inequality of Jupiter and Saturn; on the Determination of the Orbits of Comets by observation.

Book XVI. *On the Motion of Satellites.*

Chapter 1. On the Motion of the Moon. Historical Notice.
Chapter 2. On the Lunar Theory of Newton.
Chapter 3. On a Lunar Inequality of long period depending on the Difference of the Two Terrestrial Hemispheres; and also on those depending on the Elliptic part of the Earth's Radius.
Chapter 4. On the Law of Universal Attraction.

Chapter 5. On the Motion of the Satellites of Jupiter. Historical Notice.

Chapter 6. On the Influence of the Great Inequalities of Jupiter on the Motion of his Satellites.

Chapter 7. On the Satellites of Saturn and Uranus.

SECOND SUPPLEMENT (the first follows the tenth book). An extended Theory of Capillary Attraction (no date).

THIRD (and posthumous) SUPPLEMENT (1827). On the Development of the Distance of Two Planets, and of its Elliptic Co-ordinates.* On the Tides of the Atmosphere.

We have spoken freely of the defects of Laplace's character, both political and scientific, and it is now our more pleasing task to say a few words on the Mécanique Céleste, as a whole. We might dwell upon the great discoveries, such as those of the long inequality of Saturn and Jupiter, the cause of the acceleration of the moon's mean motion, the explanation of the peculiarities in the motion of Jupiter's satellites, with a long train of similar achievements. But this, though the most common method of describing the character of a philosopher, is not the sort of description which should be given of the Mécanique Céleste. Its bulk is about 2000 quarto pages; and, owing to the omission of all the steps which a good mathematician may be relied on as able to supply, it would, if expanded to the extent in which Euler would have written the same matter, have probably reached ten thousand pages. If all this work had been collected by one man, even from the writings of others, we should have called him the Delambre of the theory of gravitation, and should have prized his writings for their extent, their faithful representation of the state of the science at a particular time, and the diligence displayed in the undertaking. When to the preceding, which is forgotten in the splendour of some of the results, we add, that to Laplace is due the discovery of much, the development of more, and that by the employment of his own resources in a manner which takes all the originality and power of the investigator, and the arrangement and combination of the whole, we may begin to see how he has earned his fame.

There is moreover another consideration which applies to the author of the Mécanique Céleste, more than to any other except that of the Principia. When an investigator produces one result after another, upon detached and unconnected subjects, we may feel admiration of his skill and sagacity, but we can never know whether he followed a route with the determination of overcoming a specific difficulty, or not. He tells us where he succeeded, but not where he failed. It is otherwise when an original writer attempts a complete system, at every part of which he must work, and must show the world either a result or a blank. It is seldom that Laplace leaves off at the same point with his predecessors, though obliged, as just stated, to strive for pre-eminence on every single point. Had he consulted his own glory he would have taken care always to note exactly that part of his own work in which he had a forerunner; and it is not until this shall have been well and precisely done that his labours will receive their proper appreciation. His mathematical style is utterly destitute of the symmetry of that of Lagrange and the simplicity of that of Euler; and he is frequently even clumsy. He pays little attention to extreme correctness of form. Upon fundamental principles, whether of mechanics or analysis, he frequently needs a commentator, at least for the student.

Laplace explained his discoveries in a work entitled 'Exposition du Système du Monde,' of which the fifth edition bears the date 1824. The account here given is in style and clearness of a superior kind, somewhat too egotistical, and partaking of the disposition to suppression already noticed. A similar companion to the Theory of Probabilities appeared as a preface to the work itself, and was published separately (fifth edition, 1825), under the title of 'Essai Philosophique sur les Probabilités.' A little treatise, published in 1821, called 'Précis de l'Histoire de l'Astronomie,' afterwards was made the fifth book of the fifth edition of the 'Système du Monde.' His lectures on the elementary branches of mathematics are in the 'Leçons de l'Ecole Normale.'

Of the 'Théorie des Probabilités' we must speak precisely as of the 'Mécanique Céleste,' adding perhaps that there is no part of the latter in which more original power is displayed than in the former. The subject being somewhat isolated, its results are little known; they have however been extensively applied to astronomy, both by Laplace himself, and particularly by the German writers.

The 'Mécanique Céleste' was partly translated into English by a learned American writer, Dr. Bowditch, whose recent death, though it has prevented his superintending the close of his work, did not take place till the whole was ready for press. The well known work of Mrs. Somerville is a selection from the 'Mécanique Céleste,' involving all the fundamental parts of the theory of gravitation. The 'Système du Monde' was translated by the late astronomer royal, Mr. Pond. The fundamental parts of the 'Théorie des Probabilités' will be found in the 'Encyclopædia Metropolitana,' article 'Theory of Probabilities;' and the method of using Laplace's results, with no other knowledge than that of common arithmetic, in the 'Essay on Probabilities' in Dr. Lardner's 'Cabinet Cyclopædia.' The forthcoming numbers of the 'Encyclopædia Britannica' will contain an article on Probabilities, in which the same results of analysis are treated.

It is sometimes stated by English writers that Laplace was an atheist. We have attentively examined every passage which has been brought in proof of this assertion, and we can find nothing which makes either for or against such a supposition. It is easy, with an hypothesis, to interpret passages of an author; but we are quite convinced that a person reading Laplace for philosophical information would meet with nothing which could either raise or solve a question as to the writer's opinions on the fundamental point of natural religion, unless it had been put into his head to look. If those who make the assertion have any private grounds for it, they should produce their evidence; but the assertion, whether considered with reference to the individual, or to the public before which it is made, should not be hazarded merely because a writer who is investigating such points as can be determined by experiment and analysis does not introduce his opinions on a question which cannot be submitted to calculation. An attempt to explain how the solar system might possibly have arisen from the cooling of a mass of fluid or vapour is called atheistical, because it attempts to ascend one step in the chain of causes; the Principia of Newton was designated by the same term, and for a similar reason. What Laplace's opinions were, we do not know; and it is not fair that a writer who, at a time of perfect license on such matters, has studiously avoided entering on the subject, should be stated as of one opinion or the other, upon the authority of a few passages of which it can only be said (as it could equally be said of most mathematical works) that they might have been written by a person of any religious or political sentiments whatever.

LAPLAND, the country of the Laplanders, comprehends the northern and north-eastern part of the Scandinavian peninsula. It is difficult to assign its boundaries. It seems that in the twelfth and thirteenth centuries all the country north of 64° N. lat., as far as Cape North Kyn and North Cape (71° 11′ and 71° 8′), between the White Sea on the east and the Norwegian Sea on the west, was entirely in possession of the people called Laplanders, and independent of any of the neighbouring kingdoms, but that along the northern coast of Norway the inhabitants of Teutonic origin advanced rapidly towards the north, probably attracted by the rich cod-fishery between the Lofoden Islands. Being settled there, and having tried to introduce agriculture with various success, they acquired great influence among the natives, and in the thirteenth century the Laplanders became subject to the king of Norway. But as this submission was rather nominal than real, the neighbouring nations, the Swedes and Russians, also settled in those districts which were nearest to their dominions. In consequence of these settlements and the changes introduced by more recent political events, Lapland is divided between Norway, Sweden, and Russia, and the settlers from these countries are now much more numerous than the original Laplanders.

Lapland probably comprises an area of about 120,000 square miles, of which about one-half is subject to Russia. It is divided from Swedish Lapland by the river Muonio, an affluent of the Tornea Elf, and by the last-mentioned river, and from that part of Lapland which is annexed to Norway by the Tana Elf; but a small tract of coast to the east of the mouth of the Tana Elf, and extending as far east as the Bugge Fiord, also belongs to Norway. Russian Lapland is divided between the two governments of Archangel and Uleaborg; in the former it constitutes the district of

Kola, and in the second that of Tornea. Swedish Lapland is divided between the two districts (lans) of Pitea and Umea, and that portion of the country which belongs to Norway is called Finmarken.

Along the Norwegian coast lies the mountain-range of the Kiölen, which rises, on the very shores of the sea, with an extremely steep ascent, so that at a distance of a few miles it attains the height of 2000 or 2500 feet, where it begins to be always covered with snow; some of its summits rise to a much greater elevation, as the Sulitelma (67° 10′ N. lat.), which attains more than 6000 feet. The eastern declivity of this range is less rapid, and the country, which is 20 miles distant from the highest part, exhibits only high hills. The highest portion of the range is chiefly composed of bare rocks, and it is only in a few places that it is covered with grass and low bushes; but stunted birch and some kinds of pines grow on the hills. These hills, between which are narrow valleys, partly occupied by large lakes and partly by forest trees, advance to a considerable distance from the principal range, and leave a more level tract only along the Bay of Bothnia, between 20 and 30 miles across. The most hilly part is south of the Lulea Elf, north of which river the country extends in rocky plains with a scanty vegetation, and mostly covered with swamps, at least during the greatest part of the year. The surface of these plains is gently inclined towards the Gulf of Bothnia, and the soil is of a better description where they approach the river Tornea and the boundary of Russia. In these parts they are covered with good forests intersected by extensive grassy tracts, which are used as meadows or pasture ground. Between the Lulea and Calix Elf, and nearly at an equal distance from the Kiölen Mountains and the Gulf of Bothnia, are several isolated high hills, consisting entirely of iron-ore.

Russian Lapland presents a different aspect. It is an extensive plain, generally covered with sand, but some isolated hills rise on the plain to an elevation of several hundred feet. A large part of this plain is covered with trees, which however in the northern districts do not grow to a great height. Other districts of great extent are sandy deserts, and in a few districts, especially along the rivers and the numerous lakes, tracts occur which are used as pasture-grounds, and sometimes cultivated.

The climate is very cold. Three-fourths of the year the country is covered with snow, and the frost between November and March is very intense. The snow does not entirely disappear till the beginning or middle of June. The spring lasts only a couple of weeks. In July and August the heat is very great, and frequently insupportable, on account of the length of the days, which in the most southern districts last nineteen or twenty hours, and in the northern several weeks; near the most northern extremity there is day for three months. Between the 10th and 25th of August some night-frosts occur, which however are again followed by warm weather that continues during the remainder of that month and the first half of September, when the night-frost re-appears, and in October the regular winter begins. The great quantity of snow which falls during the winter gives origin to the numerous lakes.

Four nations inhabit Lapland—the Laplanders, Swedes and Norwegians, Finlanders, and Russians. The original inhabitants, the Laplanders, have been driven by the foreign settlers from the best part of the country, and occupy at present only the more sterile inland parts beyond the polar circle; but they visit with their herds of reindeer all the highest portions of the Kiölen range as far south as 63° N. lat., where reindeer moss is found. Their number does not exceed 7000, and they are divided into reindeer Laplanders and fishing Laplanders. The former live either entirely or mostly on the produce of their herds, which in summer they conduct to the more elevated parts of the mountains; they pass the winter in the level country, which is settled by the other nations. Some of them possess 500 and even 1000 head of reindeer; the richest are in Russian Lapland. The fishing Laplanders, who are most numerous in Russian Lapland, are dispersed among the lakes and along the banks of the rivers, where they live on the produce of their fisheries. The number of the Swedes and Norwegians is very considerable; they occupy those tracts which are adapted to agriculture, where they cultivate rye, barley, oats, and potatoes. Rye grows as far as 66° N. lat., barley and oats to 68°, and potatoes appear to succeed as far north as the two last-mentioned kinds of grain. The countries along both sides of the Gulf of Bothnia are occupied by the Swedes, whose settlements also extend many miles inland; they keep a number of cattle proportionate to the extent of their fields. But the best pasture-grounds and meadows are in possession of the Finlanders, who probably settled at an earlier date among the Laplanders than the other foreigners. They occupy large tracts in the level country, where they apply themselves to the rearing of cattle; they are distinguished by their skill in the management of the dairy. The Russians live only in the district of Kola, where they are chiefly occupied as fishermen or as merchants. Only a few of them apply to agriculture or the rearing of cattle.

Besides cattle, horses, sheep, and goats are numerous, but hogs are rare. Wild animals are numerous, as immense tracts are deserts, and probably uninhabitable. Some of the larger animals however are now scarce, as bears and beavers. Wild reindeer are still found in considerable numbers, as well as wolves, lynxes, wolverines, foxes, hares, squirrels, martens, and otters. Lemmings sometimes come down in large numbers from the Kiölen Mountains, and lay waste the low country. Among the birds are eagles, capercailies, woodcocks, and a variety of sea-birds, which are particularly numerous along the coast of Norway. Gnats abound, especially in Russian Lapland; and the Swedish naturalist Wahlenberg is of opinion that they serve as dung to the country, which would be still more sterile without them. The forests, which cover a considerable part of the surface of the country, consist mostly of birch, fir, pine, alder, and aspen. The soil, which is overgrown by these forests, is chiefly covered with reindeer moss (*Lichen Islandicus*), which also covers the lower declivities of the higher part of the Kiölen range, and on which the numerous herds of reindeer feed.

(For a more particular account of the Laplanders, see SWEDEN and NORWAY.)

(Bech's *Travels*; Schubert's *Reise durch Schweden, Norwegen, Lappland, Finnland, und Ingermanland*.)

LA PLATA. [PLATA, LA.]
LAPLY'SIA. [TECTIBRANCHIATA.]
LAPSE. [LEGACY.]
LAPWING. [PLOVERS.]
LAR, LARISTAN. [PERSIA.]
LARASH. [MAROCCO.]

LARCENY (*latrocinium*, Latin; *larcin*, French) is the legal term for theft.

This crime was formerly divided into grand and petty larceny, distinguished by the value of the property taken at one and the same time. It was grand larceny where the value was more than twelve pence; petty larceny where the value did not exceed that amount: a distinction referable to times in which twelve pence was more than equivalent to as many shillings of the present currency. At common law the punishment of petty larceny was whipping or imprisonment; that of grand larceny was death, unless the offender were in a situation to claim benefit of clergy, of which mode of escaping punishment neither women, nor men who were unable to read, or who had been twice married, or who had married widows, or who, not being actually clergymen, had before taken the benefit of clergy, could avail themselves. [BENEFIT OF CLERGY.] By 4 George I., c. 11, grand and petty larceny were made punishable by transportation.

By 7 & 8 George IV., c. 28, the distinction between grand and petty larceny is abolished; and larcenies are now distinguished as simple or compound, sometimes called mixed, larcenies.

I. Simple larceny at common law is committed by wrongfully taking, against the will of the owner, and carrying away the goods of another, with the fraudulent and felonious intent wholly to deprive him of his property therein.

First, there must be a wrongful taking against the will of the owner, which taking may be either actual or constructive. Actual taking against the will of the owner is where goods are taken directly either out of the possession of their absolute owner, or out of the possession of a bailee, or temporary owner. Constructive taking against the will of the owner is either where the possession of goods is obtained from the owner with a preconceived intention on the part of the person to steal them, in which case the original taking is felonious, or where the owner, without divesting himself of the legal possession of the goods, delivers them into the hands of a person who afterwards converts them to his own use or to some other purpose inconsistent with the continu

ance of the owner's property therein, in which case such conversion constitutes the felonious taking. The doctrine of constructive taking has given rise to many nice distinctions. Generally speaking, there can be no larceny where the possession is voluntarily parted with. Thus if I lend another my horse for a certain period, and he rides away with the horse and sells him, it is no larceny, but a civil wrong, for which the only remedy is by action. But where the possession of a horse is obtained on the pretence only of borrowing, and with the intent to keep or sell him, such parting with the possession by the owner will not diminish the criminal responsibility of the taker. Larceny is not committed when the possession is obtained in the first instance bonâ fide without any fraudulent intention. Thus where A saves goods from a house on fire, and takes them home, having at the time an honest intention of preserving them for the owner, although the next morning A conceals the goods and denies having had the possession of them, it is a breach of trust, and no felony. Where however the absolute or temporary owner bails or delivers goods to another, but retains the beneficial possession of them, a conversion of the goods by such bailee to his own use will be larceny. A servant entrusted with his master's goods, a shepherd with sheep, &c., who embezzles them, is guilty of larceny at common law, because in such cases the possession of the servant, &c. is in law the possession of the master. If the owner is, by whatever means, induced willingly to part with his *property* in the goods, and not merely with the possession of them, the offence does not amount to larceny; as where possession of goods is obtained under colour of a purchase actually completed, although with an intention of running off without paying for them. But where the owner of a horse on sale allows his paces to be tried by a person who mounts and rides off with the horse, it is larceny, as the owner never parted with the property, nor indeed with the possession, for goods in the presence of the owner are in law considered as in his possession, though used by another. Where A goes to B's shop in the name of C, and asks for a hat which C has ordered, and it is delivered to A, who converts it to his own use, it is no larceny, because by such delivery B parted with the *property* in the hat. But if upon A's asking for the hat, B had delivered two hats for C to choose from, and A had converted both or either to his own use, the offence would have been larceny, because B parted with the possession only, and not with the property, as the right of property would have remained in B until C had made his election, and the bare possession was obtained fraudulently.

Secondly, there must not only be a taking, but also a carrying away, technically called asportation, to constitute which the goods stolen must be actually removed from the position which they before occupied. Entire removal, to however slight a distance, is a sufficient asportation; as if a thief be detected whilst leading a horse out of a field. So where A goes to an inn, and says to the ostler, 'Bring out my horse,' pointing to B's horse as his own; whereupon the horse is led out; but before A can mount, B comes up. So where a guest, with intent to steal goods out of an inn, removes them down stairs; or a thief, intending to steal plate, takes it out of a chest and lays it upon the floor, or intending to steal a cask from a waggon, removes it from one end of the waggon to the other. But though there must be an actual removal of every part from its previous position, it is not necessary that each portion of the article stolen should be removed from the space which was previously occupied by other portions of that article. Thus where A in raising a bag from the bottom of a coach-boot removes each part of the bag from the space which that specific part occupied, though the whole bag be not removed from every portion of the space which the bag filled in that boot, the asportation is complete. So where A has drawn a book about an inch above the top of B's pocket, B puts up his hand, and A drops the book and it falls back into B's pocket, it is larceny. So where a package is, for the purpose of cutting it open and getting at the contents, merely set on end in the place where it had lain, and the thief is disturbed before he has effected his purpose, the larceny is complete. But where a severance is necessary before the thief can have the entire control over the article, the asportation is not complete until such severance is effected; as where goods in a shop are fastened by a string to the counter, or a purse is entangled with keys in the owner's pocket.

Thirdly, the thing taken must be goods; and at common law larceny could be committed only in respect of personal goods. Things real, or things annexed to the soil, technically called the realty, or which are connected with the soil and freehold, and which are therefore, in legal language, said to savour of the realty, were not subjects of larceny at common law. This rule was observed so strictly, that larceny could not be committed by stealing title deeds, nor by stealing growing corn, grass, trees, &c., unless severed from the realty by the thief or by the owner, or by a third person, and taken at another time.

The subject matter of larceny at common law must also have been of things *in possession*, as distinguished from things (technically called choses) *in action*, i.e. things which are of no intrinsic value, but are capable of being made available by action or demand, as deeds, bonds, bills, notes, and other securities for money, &c.

The inconvenience arising from these rules, which are adapted to a very different state of society, is remedied by several statutes passed during the last and the present century.

The objection founded upon the connection of the thing stolen with the realty is removed by several provisions of 7 and 8 Geo. IV., c. 29. That statute, sec. 23, makes the stealing of written or printed papers or parchments, being evidence of title to real estate, a misdemeanor punishable at the discretion of the court by transportation for seven years, or by fine or imprisonment, or both. It further enacts, sec 38, that if any person steal or cut, break, root up, or destroy or damage, with intent to steal, any tree, sapling, or shrub, or any underwood growing in a park, pleasure-ground, garden, orchard, or avenue, or in ground adjoining to a dwelling-house (in case the value of the article or articles stolen, or the amount of the injury done, exceed one pound), he shall be guilty of felony, and liable to punishment as for simple larceny: so if the trees, &c. be growing elsewhere, and the value or amount of injury exceed five pounds. It further enacts (s. 39) that if any person steal or break, root up, destroy or damage, with intent to steal, the whole or part of any tree, sapling, or shrub, or any underwood, wheresoever growing, the value of the articles stolen or the injury done being to the amount of a shilling, every such offender, being convicted before a justice of the peace, shall for the first offence forfeit, over and above the value of the articles stolen or the amount of the injury done, a sum not exceeding five pounds; and any person so convicted who shall afterwards be convicted of any of the said offences is to be imprisoned and kept to hard labour for a term not exceeding twelve months; and if the second conviction take place before two justices, they may order the offender, if a male, to be whipped; and if any person so twice convicted afterwards commit any of the said offences, such offender is to be deemed guilty of felony, and is liable to be punished in the same manner as in the case of simple larceny. It further enacts (s. 42) that if any person steal, or destroy or damage, with intent to steal, any plant, root, fruit, or vegetable production, growing in any garden, orchard, nursery-ground, hothouse, greenhouse, or conservatory, every such offender, being convicted thereof before a justice of the peace, shall, at his discretion, either be committed to the common gaol or house of correction, there to be imprisoned only or to be imprisoned and kept to hard labour for not more than six months; or else shall forfeit, over and above the value of the articles stolen or the amount of the injury done, such sum not exceeding twenty pounds as to the justices shall seem meet; and that if any person so convicted shall afterwards commit any of the said offences, the offence shall be deemed felony, and shall be punishable as in cases of simple larceny.

By the same statute (s. 44) it is made felony, punishable as in cases of simple larceny, to steal, or rip, cut or break, with intent to steal, glass or wood-work belonging to any building, or lead, iron, copper, brass, or other metal, or any utensil or fixture fixed in or to any building, or anything made of metal fixed in land, being private property, or for a fence to any dwelling-house, garden, area, or in any square, street, or other place dedicated to public use or ornament; and by s. 37 it is made a felony, punishable as in cases of simple larceny, to steal, or sever with intent to steal, the ore of any metal, or any lapis calaminaris, manganese, or mundic, or any wad, black cawke, or black lead, or any coal or cannel coal, from any mine, bed, or vein thereof. The stealing of any chattel or fixture let to be used with any

house or lodging is by the same statute (s. 45) made felony, punishable as simple larceny.

With respect to choses in action, the same statute enacts (s. 5) that if any person shall steal any tally, order, or other security, entitling or evidencing title to any share or interest in any public stock or fund, or in any fund of any body corporate, company, or society, or to any deposit in any savings' bank, or shall steal any debenture, deed, bond, bill, note, warrant, order, or other security for money, or shall steal any warrant or order for the delivery or transfer of goods or valuable things, the offence shall be deemed felony of the same nature and in the same degree, and punishable in the same manner as the stealing of any chattel of like value with the share, interest, or deposit to which the security so stolen may relate, or with the money due on the security so stolen or secured thereby, or with the value of the goods or other valuable thing mentioned in the warrant or order. It also enacts (s. 21) that if any person shall steal, or shall, for any fraudulent purpose, take from its place of deposit or from any person having lawful custody thereof, or shall unlawfully or maliciously obliterate, injure, or destroy any record, writ, return, panel, process, interrogatory, deposition, affidavit, rule, order, or warrant of attorney, or any original document belonging to any court of record, or relating to any matter, civil or criminal, begun, depending, or terminated in any such court, or any bill, answer, interrogatory, deposition, affidavit, order, or decree, or any original document belonging to any court of equity or relating to any cause or matter in any such court, the offence shall be a misdemeanor, and subject at the discretion of the court to transportation for seven years, or such other punishment by fine or imprisonment, or by both, as the court shall award. And by s. 22 the stealing, or, for any fraudulent purpose, destroying or concealing a will or other testamentary instrument, is a misdemeanor punishable by transportation for seven years, or by fine or imprisonment, or both.

The Post-Office Act, 7 Will. IV. and 1 Vict., c. 36, s. 26, makes the stealing and embezzling of post letters, letter-bags, &c., felony, punishable with a greater or less degree of severity, according to the nature of the offence and the existence or non-existence of a confidential character in the guilty party. [Post-Office.]

Fourthly, the goods taken should generally be the goods of another person.

If a man take his own goods supposing them to be the goods of another, no larceny is committed. It is otherwise where the taking is for the purpose of fraudulently charging another with the loss; as if a man steal his own goods for the purpose of charging the bailee, or of throwing the supposed loss upon the hundred. If a wife take and convert to her own use the goods of her husband, they being but one person in law, it does not constitute larceny.

A joint tenant or tenant in common of any personal chattel cannot commit larceny respecting such chattel as against his co-tenant. But if such chattel be bailed or delivered to the care or keeping of a third party for safe custody, and the effect of the taking be to charge such bailee, it amounts to larceny.

The converting of found goods by the finder to his own use does not amount to larceny, unless at the time of the conversion he knows, or has the means of knowing, who is the real owner.

No larceny can be committed of things which are not the subject of property, as a human corpse, or of things the use of which is common to all mankind, as running water, wild animals in their natural liberty, &c. It is otherwise of animals which are dead, or are reclaimed or confined, and which are useful to man as food or otherwise. But the stealing of dogs, cats, and ferrets, though tame and valuable, and of bears, monkeys, &c., though reclaimed or confined, does not amount to larceny. But by 7 and 8 George IV., c. 39, s. 33, the stealing of dogs and of beasts and birds, ordinarily kept in a state of confinement, is made cognizable by justices of the peace. And by s. 26, it is a felony, punishable as in cases of larceny, to course, hunt, snare, or carry away, or kill, or wound deer kept or being in the enclosed part of a forest, chase, or purlieu, or in enclosed land in which deer are usually kept. If in an unenclosed part, the offence is made cognizable by a justice of the peace, with power to impose a pecuniary penalty not exceeding 50*l*.; and a second offence, whether of the same description or not, is made felony, punishable as simple larceny.

Stealing oysters or oyster brood from a marked-out or known oyster bed, laying, or fishery, is made larceny by 7 & 8 Geo. IV., c. 29, s. 36.

Fifthly, there must be an intent wholly to deprive the owner of the goods stolen of his property therein, which intent constitutes the fraudulent and felonious character of the act. The most common motive for a theft, and the ordinary mode of depriving the owner of his property in the thing stolen, are the conversion of it to the use of the taker; and Blackstone and others have considered that such conversion to the use of the thief, or some benefit to be derived to him, is essential to the completion of the offence, agreeably to the definition of *furtum* in the civil law, 'contrectatio rei fraudulosa lucri faciendi causâ.' But it appears to be now settled that a wrongful destruction of the goods taken, whereby the owner is wholly deprived of his property therein, is sufficient to constitute this offence, although no benefit is sought to be derived to the taker.

Persons convicted of simple larceny are, by the 7 & 8 George IV., c. 29, made liable, at the discretion of the court, to be transported for seven years, or to be imprisoned for a term not exceeding two years, and, if males, to public whipping in addition to imprisonment; and the court is empowered to sentence the offenders to be imprisoned and kept to hard labour, and also to direct that they shall be kept in solitary confinement as to the court in its discretion shall seem meet. 7 Will. IV. & 1 Vict., c. 90, s. 5, restricts the courts from directing that any offender shall be kept in solitary confinement, for any longer period than one month at a time, or than three months in the space of one year. Where the party convicted is a person already imprisoned under sentence for another crime, the court is empowered by 7 & 8 George IV., c. 28, s. 10, to award imprisonment for the subsequent offence, to commence at the expiration of the imprisonment to which such person has been previously sentenced; and where such person is already under sentence either of imprisonment or of transportation, the court, if empowered to pass sentence of transportation, may award such sentence for the subsequent offence, to commence at the expiration of the imprisonment or transportation to which such person has been previously sentenced.

As cattle are necessarily left in fields and upon commons and wastes, without any person to attend them, the legislature has interfered to protect property of this description by heavier punishments than those inflicted in other cases of larceny. Cattle-stealers were by several statutes excluded from benefit of clergy; and upon the abolition of the distinction between capital and clergyable felonies by 7 & 8 George IV., c. 29, stealing any horse, mare, gelding, colt, or filly, or any bull, cow, ox, heifer, or calf, or any ram, ewe, sheep, or lamb, or wilfully killing such cattle with intent to steal the carcass or skin or any part of the cattle so killed, was made a felony punishable with death. But now under 7 Will. IV. & 1 Vict., c. 90, the punishment of this offence is transportation for not more than fifteen or less than ten years, or imprisonment not exceeding three years.

A person guilty of larceny may be indicted for the offence at the suit of the crown [Indictment]; and he might formerly have been appealed or accused in a private action brought by the party injured [Appeal] to punish the offender and obtain restitution. The appeal is now taken away; but the party injured, and indeed any other person, may prefer a bill of indictment without the leave or even the knowledge of the crown or its officers. But the crown may interpose by entering a nolle prosequi before judgment, or by pardoning the offender afterwards; whereas in an appeal the crown could neither stop the proceedings nor pardon the appellee, whose life after conviction and judgment was wholly at the mercy of the appellant.

II. Compound larceny is where the crime of larceny is accompanied by circumstances which the legislature has considered as aggravating the offence and requiring an increase of punishment.

Under 7 & 8 George IV., c. 29, s. 6, stealing from the person of another, whether openly or clandestinely, is a felony punishable by transportation for life or not less than seven years, or imprisonment for not more than four years with or without whipping. To constitute this offence the thing stolen must be completely removed from the person of the owner, though such complete removal is not necessary

in cases of simple larceny. It is no answer to the charge, that such force or fear was used as would make the offence amount to robbery. [ROBBERY.]

Breaking and entering any church or chapel (by which is meant a chapel in connexion with the Established religion) and stealing therein any chattel, or breaking out of any church or chapel after having stolen any chattel therein, was made a capital felony by 7 & 8 George IV., c. 29, s. 10, but the punishment was mitigated to transportation for life or for not less than seven years, or imprisonment not exceeding three years with or without hard labour and solitary confinement, by 6 & 7 William IV., c. 4.

By 7 & 8 George IV., c. 29, s. 12, breaking and entering a dwelling-house and stealing therein any chattel, money, or valuable security to any value whatever, or stealing in a dwelling-house any chattel, money, or valuable security to the value of 5*l.* without a breaking and entering, was made a capital felony. The offence is now, under 7 Will. IV. & 1 Vict., c. 90, a felony punishable by transportation for not more than fifteen or less than ten years, or imprisonment not exceeding three years; and the same punishment is provided in cases where any such property is stolen in a dwelling-house, and any one being therein is by menace or threat put in bodily fear; and also in cases of breaking and entering a building within the curtilage of a dwelling-house and occupied therewith, and stealing in such building.

The same punishment is affixed to the offence of breaking and entering a shop, warehouse, or counting-house, and stealing therein any chattel, money, or valuable security; and to the offence of stealing, to the value of 10*s.*, any goods or article of silk, woollen, linen or cotton whilst laid, placed or exposed during any process of manufacture in a building, field, or other place; and to the offence of stealing goods in a vessel, barge, or boat in any port or upon any navigable river or canal, or any creek belonging thereto, or from a dock, wharf, or quay adjacent thereto; and to the offence of plundering or stealing any part of a vessel in distress, or wrecked, stranded, or cast on shore, or any goods or articles belonging to such vessel. (For the Roman law of theft see ROBBERY.)

LARCH TREE. [ABIES.—*Abies Larix.*]

LARCHE'R, PIERRE HENRI, born at Dijon in 1726, applied himself especially to the study of the Greek classics, and made himself known by several translations from them, the principal of which is his translation of Herodotus, with a commentary, Paris, 1786, a useful book, which was republished in an improved edition, 9 vols. 8vo., 1805. In 1774 Larcher published a 'Memoir on the Goddess Venus,' which obtained the prize of the Academy of Inscriptions, of which body he afterwards became a member. He had a controversy with Voltaire, in consequence of some strictures which he wrote on Voltaire's 'Philosophie de l'Histoire.' Voltaire replied in his usual sarcastic vein in the 'Défense de mon Oncle,' and Larcher answered him in the 'Reponse à la Défense de mon Oncle.' After the Revolution, Larcher was made a member of the National Institute. He died at Paris, in December, 1812.

Larcher's translation of Herodotus, which is his chief work, has the merit of being generally correct, but it has no recommendations of style, and as a work of art it altogether fails to represent the beautiful simplicity of the original. The commentary on the text is still useful, though it is far from containing all that might now be added in illustration of Herodotus. Larcher also translated the Anabasis of Xenophon.

LARD. [FAT.]

LARDNER, NATHANIEL, D.D., born 1684, died 1768, devoted a long life to the prosecution of theological inquiry, to the exclusion of attention to almost any other subject. The results which he communicated to the world from time to time show at once the assiduity with which he laboured in this department, and the ability which he possessed to conduct his learned researches to a successful issue.

Dr. Lardner was an English Dissenting Minister, belonging to the denomination called Presbyterian. In early life he was a pupil of Dr. Joshua Oldfield, a minister of eminence in that denomination, but he took a course which many of the Dissenters of his time took, going abroad to prosecute his studies. He spent more than three years at Utrecht, where he studied under Grævius and Burmann, and was then some time at Leyden. He returned to England in 1703, and continued prosecuting his theological studies with a view to the ministry; but it was not till he was twenty-five that he began to preach.

The course of his after-life is soon described. He became private chaplain in the family of Lady Treby, who died in 1729; and was a lecturer at the Dissenting chapel in the Old Jewry. He was not acceptable as a preacher owing to the want of power to modulate his voice, arising from the imperfection of his sense of hearing.

The Dissenters have no means of placing their scholars in any situations which can leave them at liberty to prosecute those studies, the results of which are of the most essential benefit to the great interests which they hold peculiarly dear; so that Dr. Lardner was thrown for the most part upon his own resources while engaged in those profound inquiries which have gained for him a name among the first theological scholars of his age and country. His 'Credibility of the Gospel History,' the 'Supplement' to it, and his 'Jewish and Heathen Testimonies,' have received the testimony of the most distinguished persons, as constituting the most rational and unanswerable defence of Christianity that has yet been prepared. These are his great works, but there are beside them many other treatises in which he has brought his stores of learning to bear on questions which are important in Christian theology. The most remarkable of these his minor publications is his 'Letter on the Logos,' in which it distinctly appears that he was of the Unitarian or Socinian School.

The best edition of his works is that by Dr. Andrew Kippis; but it is no mean proof of the estimation in which they are held, that large as they are when collected together, the booksellers not long ago ventured on a republication of them.

LARES, among the Romans, were household gods; the guardians of their hearths and families. There is much dispute upon the etymology of this term. Apuleius derives it from *Lar, familiaris.* Ovid speaks of the Lares as the offspring of Mercury and Lara. From a passage in Virgil's 'Æneid,' ix., 255, it should seem that these Lares of the Romans were the *manes* of their ancestors. According to Ovid ('Fasti,' v., 146) there were generally two of them, who were sometimes represented with a dog at their feet. Others were clothed in the skin of a dog. They usually held a cornucopiæ in their hands as a symbol of good housekeeping. The festival of the Lares was celebrated on the kalends of May (Ibid., v., 129) when they were crowned with garlands and sacrifices were offered to them. Pitiscus records an inscription, 'LARIBVS PRO SALVTE ET INCOLVMITATE DOMVS Q. SERTORII.' There were not only *Lares domestici et familiares,* but *Lares urbani, rurales, viales, compitales, marini,* &c.

LARGHETTO (Italian), a musical term, a diminutive of Largo [LARGO], slow, but less so than Largo.

LARGO, in music (Ital. adverb, *largely, widely*), is the second in order of the five classes into which musical movement is divided [ADAGIO], and signifies *slowly.*

LARGS, a small town in the parish of Largs and county of Ayr, 65 miles south-west by west from Edinburgh. It is pleasantly situated on the shore of the Frith of Clyde immediately opposite to the island of Bute, and there are few situations which exhibit more romantic scenery. The church is of some antiquity, and the living, which is in the presbytery of Irvine and synod of Glasgow and Ayr, is in the gift of the Earl of Eglinton. The parochial school is well attended, and the master's salary is 20*l.*, exclusive of school fees. The market-day is Thursday, and the fairs are held the beginning of the months of February, June, July, and October. The population of the town and suburbs in 1831 was 2045.

LA'RIDÆ, the name given by Leach to the family of birds vernacularly known as *Sea-Gulls, Sea-Mews,* or *Gulls,* belonging to Mr. Vigors's fifth order *Natatores.*

Willughby, in his 'Ornithology,' under his section (vi.) 'Of *Sea-Gulls,* called in Latine *Lari,*' says in his first chapter of that section ('Of Gulls in General')—'Gulls are a whole-footed fowl, with an indifferent long, narrow, sharp-pointed bill, a little crooked at the end; oblong nosthrils; long and strong wings; short legs; small feet (for they do not swim much); a light body, but invested with many and thick-set feathers; a carrion carkass, the fat that is sticking to the skin (as in other birds); much upon the wing, very clamorous, hungry, and piscivorous.'

'These we divide into two kinds: 1st, *the greater,* which

have tails composed of feathers of equal length, and an angular prominency or knob on the lower chap of the bill underneath to strengthen it, that they may more strongly hold fishes; 2nd, *the lesser*, which have a forked tail, and no knob on the bill (or, he adds in a marginal note, but a very small one) Both kinds may be divided into *pied* or *particoloured*, and *grey* or *brown*.'

Willughby places the Gulls between the 'Douckers, or Loons, called in Latine Colymbi,' and the 'whole-footed birds with broad bills,' the first members of which are 'the goose-kind,' commencing with the Swan

Ray's 'Synopsis' places the Gulls between the Colymbi and the 'Aves Palmipedes rostro in extremo adunco, non serrato,' *Avis Diomedea* (Albatross), Shearwater, Puffinus, &c, and he describes them as 'Palmipede Birds, with a narrow, sharp, but not hooked (*adunco*) bill, long winged, and much given to flight (*volaticæ*), called *Lari*, in English *Guls* or *Sea Mews*, and in some places *Sea-Cobs*,' with the following definition —'The marks of Gulls are a strong, oblong, narrow, and acute bill, which is a little curved at the extremity, but in the smaller species straighter, *nostrils* oblong, *wings* oblong and strong; *feet* small, *body* very light, clothed with many and thick feathers, and to be clamorous, much on the wing, hungry, and piscivorous.'

He divides the Gulls into three sections viz,

1 The Three-toed Gulls, 'Lari tridactyli, seu postico digito carentes,'

2 Four-toed Gulls, 'Lari tetradactyli, seu postico digito donati and

3 Fork-tailed Gulls, 'Lari minores, caudâ forcipatâ' (Terns, &c)

Brisson placed in his twenty-third order (consisting of birds with four toes, the three anterior joined together by membranes and the posterior separate, and with a toothless bill), the Gulls, Petrels, Puffin, Terns, Sea-skimmer or *Rhyncopsalia* (*Rynchops*, Linn), &c

The second division of the third order (*Anseres*) of Linnæus consists of those web-footed water-fowl which have an edentulous bill, and the following are the genera of that order *Rhynchops*, *Diomedra*, *Alca*, *Procellaria*, *Pelecanus*, *Larus*, *Sterna*, and *Colymbus*

M Lacépède's second subclass of birds consists of those which have the lower part of the leg denuded of feathers, or many toes united by a large membrane. The first division of this subclass comprises those birds which have three anterior toes, and one toe or none behind. In the first subdivision, the first order (the twenty-second reckoning from the beginning), consisting of palmiped water-birds with a *hooked beak*, we find *Diomedea* and *Procellaria*, among other genera, and in the third (twenty-third reckoning from the beginning) are placed, also among other genera, *Rhynchops* In the fourth (twenty-fifth reckoning from the beginning), with a *straight* and *slender bill*, we have the genus *Sterna*, and, in the next but one (twenty seventh), *bill tumid* (bec renflé) we have the genus *Larus*, the intervening genus being *Recurvirostra* (Avosets)

M Duméril's third family (twenty-second in the series), consists of the *long-winged Palmipedes*, and includes *Rhynchops*, the Terns the Avosets, the Petrels, the Albatrosses, and the Sea Mews

In the method of M Meyer, we find the first suborder (*Cornirostres*) of his eleventh order, *Natatores* comprising, among other genera, those of *Sterna*, *Larus*, and *Lestris*

The long-winged *Natatores* (Longipennes) of Illiger consist of the genera *Rhynchops*, *Sterna*, *Larus*, and *Lestris*, and his *Natatores* with tubular nostrils (*Tubinares*), of *Procellaria*, *Haladroma*, *Pachyptila*, and *Diomedea*

Cuvier's *Long-winged Palmipedes* comprise the Petrels, Albatrosses Gulls, Terns, and *Rhynchops*

The fourth family (Pelagians) of M Vieillot's first tribe (*Teleopodes*) of the order *Natatores* consist of *Stercoraria*, the Gulls, Terns, and *Rhynchops*

M Temminck places the whole of the *Palmipedes* in one order.

M De Blainville's *Natatores* consist of the *Macroptères* (Gulls), the *Syphonorhiniens* (Petrels), the *Cryptorhiniens* (Pelicans), and the *Colymbiens* In his method as developed by M Lherminier the Gulls (*Larus*) and the Petrels (*Procellaria*) are placed in his first subclass or *Normal Birds*.

Mr Vigors (*Natural Affinities that connect the Orders and Families of Birds*, 'Linn Trans,' vol. xiv) states that *Phaeton*, a genus belonging to the immediately preceding family (*Pelecanidæ*) bears a considerable resemblance in general appearance and habits to *Sterna* belonging to the succeeding family of *Laridæ*, the structure of their foot alone effecting a separation between them. Even here however, he remarks, we may observe the gradation that exists between the feet of the two families, the web that unites the toes of the *Tropic*, as well as of the *Frigate Bird*, being but half the size of that of the *Pelecanidæ* in general; and thus their foot preserves a connexion with that of the *Terns*, where the same membrane is equally contracted. 'We thus,' continues Mr Vigors, 'enter the family of *Laridæ* by means of *Sterna*, with which *Rhynchops*, Linn, most intimately accords in habits and external characters, notwithstanding the dissimilitude of the bill The *Sterna Anglica*, or Gull-billed Tern of Col Montagu, conducts us from these genera to the groups which compose the Linnæan *Larus*, now justly subdivided into two genera, the *Lestris*, Ill, and *Larus* of authors From this group we are led to the genera *Diomedea*, Linn., and *Haladroma*, Ill, which are characterised by the absence of the hind toe, by means of the species *Larus tridactylus*, Lath, where, though the hind toe is not absolutely deficient, as might be inferred from the specific name, there appears but the rudiment of one, or rather a stump without a nail. The last mentioned genus, *Haladroma*, originally belonged to the *Procellaria*, Linn, and was separated from it by its tridactyle foot Even in this character however it forms a passage from *Larus* to the groups that compose the genuine *Procellaria*, all of which are distinguished by the singular peculiarity of having no true hind toe, but a nail adhering to the tarsus in its place We thus arrive at the Petrels, separated into the groups of the *Procellaria*, Auct, *Pachyptila*, Ill, *Puffinus*, Ray, and the section denominated by M Temminck 'Les Petrels Hirondelles These two latter groups appear to lead us back to the *Terns*, or *Sea-Swallows*, from whence we started The whole of this family, which corresponds with the *Longipennes* of M Cuvier, is distinctly characterized by the strength and expansiveness of their wings, with the aid of which they traverse immeasurable tracts of the ocean in search of their food, and support their flight at considerable distances from land, seldom having recourse to their powers of swimming We may thus discern the gradual succession by which the characters peculiar to the order descend from the typical groups that swim and dive well and frequently, but make little use of their wings for flight, to the present groups, which are accustomed to fly much, but seldom employ their powers of swimming and never dive. The family of *Laridæ* may thus be observed to stand at the very extremity of the order, and it assumes, as I have already observed, in conjunction with the other extreme groups, much of the habits of the land birds A portion of the group before us, the *Petrels*, seem even to employ their feet in their own element as if on land, walking as it were, on the surface of the waters. We have thus arrived at the termination of the last family of the order, and have to look for its connexion with the first This link is immediately supplied by the before mentioned genus *Pachyptila*, in which the bill, broad and depressed at the base, assumes the character of that of the *Anatidæ* There is indeed a considerable approximation and interchange of character between the two groups The bill of some species of *Anser* may be observed to become gradually less broad and more compressed, so as to bring them closely to the *Petrels*, while again the web that connects their toes is equally curtailed in extent, until in one species, the *Semipalmated Goose* of Dr Latham figured in the supplement to his '*Synopsis*,' we may observe no greater web than may be seen among many of the *Sternæ* On the other hand, the same membrane is so extended in some of the *Petrels*, as to equal the most dilated web observable among the *Anates*. We may also add that the divisions of the *Procellariæ*, as they approach the *Anatidæ*, become gradually more nocturnal in their habits, and thus adopt a character common to a great portion of the latter family Here then in the fifth and last order of birds we perceive the families of which it is composed following each other in a regular series of affinities, which returns into itself with a continuity similar to that which has been equally apparent in every other great department of the class'

M Latreille places the Gulls, Puffins, *Pelecanoides*, Petrels, Albatrosses, Terns, Noddies, *Pachyptila*, and *Rhynchops* in his third family (*Longipennes*), of his seventh order

(*Palmipedes*), belonging, with the *Echassiers* (*Grallatores*), to his second section, *Aquatic Birds*.

The Prince of Musignano, in his 'Tabella Analitica de' Generi' (*Specchio Comparativo*), makes the *Longipennes* the first family of his order *Anseres*. He divides the family into two sections: 1. 'Narici senza margine rilevato,' consisting of the genera *Rhynchops*, *Sterna*, *Larus*, and *Lestris*. 2. 'Narici tubulose,' containing the genera *Procellaria* and *Diomedea*.

M. Lesson, in his 'Projet,' makes the *Palmipedes* (*Natatores*) his eighth order, being the third of his second section, *Aquatic Birds*. In the Table Méthodique, at the end of his 'Manuel,' his fourth family of *Palmipedes* is named *Laridæ*, and consists of the genera *Sterna*, *Rhynchops*, *Larus*, *Stercorarius*, *Diomedea*, *Haladroma*, *Procellaria*, *Pachyptila*, *Puffinus*, and *Thalassidroma*. The family is arranged by M. Lesson between the *Pelecanidæ* and the *Anatidæ*, which form his last family.

Mr. Eyton, in his 'Catalogue of British Birds,' enumerates the following genera and subgenera as constituting the family of *Longipennata*: Genus *Procellaria*, Linn.; subgenera *Puffinus*, Ray; *Fulmarus*, Stephens; *Thalassidroma*, Leach. Genus *Lestris*, Temm.; Genus *Larus*, Linn.; subgenera *Rissa*, Leach; *Larus*, Stephens; *Chroicocephalus*, Eyton; *Xema*, Leach; *Sterna*, Linn.; and *Anous*, Leach.

Mr. Swainson, who refers to Mr. Vigors's arrangement above noticed, speaks of the *Laridæ* as constituting a much more numerous family than either of the three, *Colymbidæ*, *Alcidæ* (Alcadæ), or *Pelicanidæ* (Pelecanidæ) previously adverted to by him. The structure of the *Laridæ*, too, he considers to be more perfect in a general sense, although inferior in that particular construction which constitutes the perfection of the order, namely, the power of swimming and diving. The wings, he remarks, are very long; and the feet, although webbed, enable these birds to walk about with perfect ease on the shore in search of food; the hind toe is very small, sometimes wanting; but the legs are nearly as long as in some of the wading birds, of which he considers them to be the representatives: the bill he notices as being slender, much compressed, and as gradually but not abruptly bent. After referring to their gregarious and omnivorous habits, their tolerable facility of swimming, their inability to dive, and their great power of flight, Mr. Swainson notices the genera in the following order, and expresses his views in the following terms:—

'The terns, or sea-swallows (Sterna), constitute the fissirostral type; they have remarkably long wings and slender bills; the tail is forked; and the plumage generally is of a delicate pearl white, with more or less black upon the head: the species are numerous, and occur in both hemispheres. The extraordinary genus *Rhynchops*, or Skimmer, although possessing much of the general habits of the terns, is eminently distinguished by the singular form of its bill, the upper mandible of which is considerably shorter than the under, and appears as if one-third of the length had been broken off: three species have been described, to which we add a fourth: they skim over the surface of the ocean with great swiftness, and scoop up small marine insects and other animals. The true or typical gulls (*Larus*) are a numerous race, dispersed in every clime, and so closely resembling each other in plumage, that many of the species are even now but imperfectly understood; they bear a close resemblance in general appearance to the terns, but the bill is stronger, and the upper mandible much more curved towards the end: many are of large size; and all are voracious devourers of fish, and of every marine animal, dead or alive, which is cast upon the shore: they particularly abound in northern latitudes, but seem to range over the whole world of waters. The parasitic gulls (*Lestris*) are the raptorial representatives, and are almost confined to cold regions; they are known by their stronger conformation, their different shaped bill, and the rough scales upon their feet: these birds, like the frigate cormorants, derive their chief supply of food by robbing their more feeble congeners; they pursue the largest gulls, and make them disgorge or relinquish their hard-earned game. The black-toed and the arctic gulls belong to this group, and both are occasionally seen on the northern shores of Britain. The genus *Diomedia* (Diomedea) includes the well-known and gigantic albatrosses, the most powerful and bulky of the whole family; they are oceanic birds, living almost constantly out at sea, but are more particularly abundant in the Pacific Ocean: we have no examples in Britain, or indeed in Europe: the extent of their outspread wings is enormous: yet their flight, except in stormy weather, is by no means lofty: like all the rapacious birds of the ocean, they are most voracious, and their flesh is rank and repulsive. The genus *Haladroma* comprises such of the albatrosses as have the bill more resembling that of the petrels, while they agree with the former in being destitute of a hind toe; but only one or two species have as yet been clearly ascertained. The true petrels (*Procellaria*) have the lower mandible truncated: we have a native example of this genus in the fulmar (*P. glacialis*), but nearly all the rest inhabit the antarctic regions; they are continually out at sea, even in the most violent storms: Cuvier mentions that their French name of *Petit Pierre* is derived from their habits of walking on the water by the help of their wings.* The shear-water petrel and some others have been separated under the very objectionable name of *Puffinus*, from the different construction of their nostrils and of the lower mandible: there is one species, the English puffin (*P. Anglorum*, Tem.), which appears to be confined to the northern coasts of Scotland. The genus *Thalassidroma*, Vig., differs from the other petrels, by having the legs longer and the bill somewhat shorter: it is composed of those small birds well known to sailors by the vulgar name of Mother Cary's chickens. We may here also mention the subgenus *Pachyptila*, as being that form which, of all this family, shows the nearest approach to the *Anatidæ*, with which we commenced the circle: the bill retains the general form of the petrels, but the base is considerably dilated, and its inner margins are found to be furnished with teeth-like laminæ. The most aberrant type of the *Laridæ* appears to be the genus *Dromas* of Paykull, a long-legged bird analogous to the flamingos: this we have never yet seen, but Temminck and others consider it has an affinity with the terns. The circle of the *Laridæ*, no less than that of the natatorial order, has now been traced, and we can only regret that our limited space prevents us from laying before the reader some of the very many analogies by which this arrangement is confirmed.'

In the 'Synopsis' at the end of the same volume, Mr. Swainson makes the *Gulls* a subfamily under the name of *Laridæ*, with this definition: 'Feet lengthened, formed both for walking and swimming:' the subfamily consists of the following genera and subgenera: Sterna, *Terns*, including *Sterna*, Linn.; *Thalassites*, Sw.; *Phæton*,† Linn.; *Rhynchops*, Linn.: and *Gavia*, Brisson; Larus, Linn., *Gull*; Lestris, Ill., *Jager*; Diomedea, Linn., *Petrels*; including *Procellaria*, *Diomedea*, Linn., *Albatross*; *Haladroma*, Ill.; *Thalassidroma*, Vig.: *Pachyptila*, Ill.; and *Dromas*, Paykull.

Having given a general sketch of the views of authors respecting this extensive family, we shall here confine ourselves to the *Gulls* only, including in that term the genera *Xema*, of Leach; *Larus*, of Linnæus; and *Lestris*, of Temminck. The other groups will be noticed under their respective titles as far as our space will permit.

Xema. (Leach.)

Generic Character.—*Bill* short, slender, straight, laterally compressed, its tip bent down; the lower mandible somewhat angulated beneath. *Nostrils* very slender, linear. *Legs* slender. *Tibiæ* naked on the lower part. *Tail* forked. (Gould.) Length about 14 inches.

Example, *Xema ridibundus*,‡—*Larus ridibundus*, Linn.

Description (*Summer plumage*).—Bill naked, skin round the eye, legs and feet, lively red; head and throat deep brown, between chocolate-colour and black; shoulders and back grey; outer edges of the quills (with the exception of that of the first, which is black) white, extremities of all but the first black, slightly tipped with white; rump, tail, and under surface white.

Winter plumage like summer plumage, saving the head, which is gradually changed from the deep colour above-mentioned to pure white, by a process which Mr. Yarrell has proved to be different from moulting. (*Trans. Zool. Soc.*, vol. i., p. 13.)

Young of the Year.—Colour of *bill* and *tarsi* more obscure; top of the head and ear-coverts mottled with brown, which is also the colour of the back and shoulders, each

* Cuvier's words, in speaking of the names of these birds, are: 'Celui de pétrel (petit Pierre) leur vient de l'habitude de marcher sur l'eau, en s'aidant de leurs ailes.'

† Phaeton.

‡ Genus Chroicocephalus of Eyton.

feather having a lighter margin; tail broadly edged with black. (Gould.)

This bird is the *Mouette rieuse ou à capuchon brun* of the French; *Gabbiano cinerizio col rostro e colli piedi rossi, Gaimone*, and *Corvo bianco* of the Italians; *Laughing Gull, Pewit* or *Blackcap, Sea Crow* and *Mire Crow* of the Modern British; *Yr wilan benddu* of the Antient British.

The old birds in their complete winter plumage are, *Larus cinerarius*, Gmel.; *Larus procellosus*, Bechst.; *La petite mouette cendrée*, Briss.; *Die alte Lachmeve im winter Kleide*, Leisler, &c.; *Kleive Zee-meeuw*, Sepp.; *Gabbiano Cenerino*, and *Gabbiano Moretta*, 'Stor. degl. Ucc.;' and *Red-legged Gull* of Latham.

In the summer or nuptial plumage the bird is *Larus ridibundus*, Linn., Gmel.; *Mouette rieuse à pattes rouges*, Briss.; *La Mouette rieuse*, Buff.; *Schwarzköpfige Meve*, Bechst., &c.; *Bruinkop Meeuw*, Sepp.; *Gabbiano Moretta*, 'Stor. degl. Ucc.;' and *Black-headed Gull* of Latham.

The young of the year are *Sterna obscura, Brown Tern*, and *Brown Gull* of Latham.

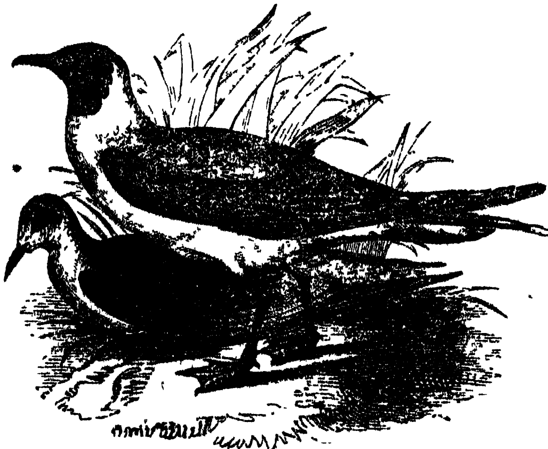
The young in their moult and in winter are, *Larus erythropus*, Gmel.; *La petite Mouette grise*, Briss.; *Larus canescens*, Bechst.; *Red-legged Gull*, Penn. 'Arct. Zool.;' *Brown-headed Gull* and *Red-legged Gull variety*, Latham. (Temm.)

Food, Habits, Reproduction.—The food of this species consists principally of insects, worms, spawn and fry, and small fishes. In habits it resembles generally the other Gulls, but it walks better. The nest, contrary to the nidification of the other Gulls, which generally form their nests on the ledges of rocks near the sea, is placed, as is the case with other Xemæ, in low situations, such as meadows in the neighbourhood of the sea or æstuaries, among the herbage on the ground. The eggs, which vary much, are generally of a deepish olive, sprinkled with large brown and blackish spots

Localities.—Rivers, salt lakes, and fresh waters; in winter only on the shores of the sea; a bird of passage in Germany and France; very abundant in Holland at all seasons of the year. (Temminck.) Mr. Selby says that in Britain they are very regular in their migratory movements (for such their departure to and from the sea coast may properly be termed), and that their return in spring may, in some cases, be calculated upon almost to a day.

Utility to Man.—Selby speaks of the eggs of this bird as being well flavoured, free from fishy taste, and, when boiled hard, as not easily distinguishable from those of the Lapwing, for which they are sometimes substituted. The young, he adds, are also eaten, although not held in such high estimation as they formerly were, when great numbers were annually taken and fattened for the table, and when the *Gullery* (or summer resort of the species) produced a revenue of from 50*l.* to 80*l.* to the proprietor. These are the *See-gulles* of the antient great festivals. In the Household Book of the fifth earl of Northumberland, begun in 1512, these *See-gulles* are among the delicacies for the principal feasts or his lordship's own *mees*, and they are charged at one penny or three halfpence each.

In Willughby's time the price was higher. He mentions a colony of these birds 'which yearly build and breed at Norbury in Staffordshire, in an island in the middle of a great pool, in the grounds of Mr. Skrimshew, distant at least thirty miles from the sea. About the beginning of March hither they come; about the end of April they build. They lay three, four, or five eggs, of a dirty green colour spotted with dark brown, two inches long, of an ounce and half weight, blunter at one end. The first down of the young is ash-coloured and spotted with black; the first feathers on the back after they are fledged are black. When the young are almost come to their full growth those entrusted by the lord of the soil drive them from off the island through the pool into nets set on the banks to take them. When they have taken them they feed them with the entrails of beasts, and when they are fat sell them for four pence or five pence a-piece. They yearly take about a thousand two hundred young ones; whence may be computed what profit the lord makes of them. About the end of July they all fly away and leave the island.'



Xema ridibundus (adult in summer plumage, and young of the year.—Gould).

Dr. Plott, in his 'Staffordshire,' adds to the history of the birds that bred in Pewit Pool, in the parish abovementioned, that they would breed on no other land than that of the proprietor of that place, and that on the death of the owner they deserted the pool for three years, but only retired to another estate belonging to the next heir. The Doctor was fond of the marvellous.

Larus.

Generic Character.—*Bill* of mean length, strong, straight, cultrated, the upper mandible having the tip incurved; symphysis of the upper mandible strongly angulated, and ascending from thence to the point. *Nostrils* placed in the middle of the bill, lateral, oblong, narrow, and pervious. *Tongue* pointed, with the extreme tip cloven. *Wings* long, acuminated. *Tail* even, or slightly forked. *Legs* placed near the centre of the body, of mean length and strength, with the lower part of the *tibiæ* naked. *Feet* of four toes, three before and one behind; the three in front united by a membrane; the hind one short and free. (Gould.)

Example, Larus marinus, Linn. (*Goëland Noir Manteau* of the French; *Great Black-backed Gull*;* *Gwylan rûdd a gywn* (Wagel) of the Antient British).

Perfect Winter Plumage of Old Birds.—Summit of the head, region of the eyes, occiput and nape white; but all the feathers marked on their middle with a longitudinal stripe of bright brown; front, throat, neck, all the lower parts, back and tail, pure white; top of the back, scapulars, and the whole wing of a deep black, shaded with bluish; quills towards the end of a deep black, all terminated with a large white space; secondary quills and scapulars terminated with white; bill whitish yellow, angle of the lower mandible bright red; naked border round the eyes red; iris brilliant yellow marbled with brown; feet dirty white. Length twenty-six or twenty-seven inches; females twenty-four to twenty-five inches. (Temminck.) Willughby's specimen measured, 'from tip to tip of the wings distended,' sixty-seven inches.

M. Temminck observes (1820) that in this state the species had never been described. Willughby and Montagu however had each described one (the latter author in his Dictionary (1802)) almost in the perfect state, and it is now beautifully figured in Mr. Gould's great work on 'The Birds of Europe.'

Summer or Nuptial Plumage of Old Birds.—Summit of the head, region of the eyes, occiput and nape pure white without any brown; naked border round the eyes orange; rest of the plumage as in winter. In this state it is *Larus marinus*, Linn.; *Le Goëland Noir Manteau*, Buff.; *Mantel Meve*, Bechst.; *Black-backed Gull*, Latham, &c. (Temm.)

Young of the year, and those one year old.—At this period the bird is *Larus nævius*, Linn.; *Larus marinus junior*, Lath.; *Le Goëland varié ou grisard*, Buff.; and *Wagel Gull*, Lath. (Temm.)

The Young of the year have the head and the front of the neck greyish-white covered with numerous brown spots, which are largest on the neck; the feathers of the upper parts are blackish brown in the middle, all bordered and terminated with reddish white, which colour forms transverse bands on the coverts of the wings: lower parts of a dirty grey, striped with large zigzags and brown spots; feathers of the middle of the tail more black than white, the lateral ones black towards the end, and all bordered and terminated with whitish; quills blackish, a little white on

* It is the *Great Black and White Gull* of Willughby; the provincial name is *Cobb*.

the point; bill deep black; iris and naked circle brown; feet livid brown.

After the first year to the age of two years.—All these colours change no otherwise than that the blackish brown and yellow of the middle of the feathers occupy gradually less extent, giving place to pure white, which then surrounds all the feathers; the white begins to predominate over the grey in the lower parts, which have gradually less of the brown spots; the head becomes pure white, and the point and base of the bill assume a livid tint.

At two years, on the autumnal moult, the mantle is defined; it is then blackish, varied with irregular brown and grey spots; the white becomes pure and only sprinkled with a few spots; the tail is pervaded with black marblings of varied forms; and the bill assumes the red spot with black in the middle,* the rest of that organ being livid white speckled with black.

At the third autumnal moult the plumage is perfect.

The young vary accidentally in having all the plumage greyish-white, with deeper spots and spots very feebly indicated; the quills whitish. Sick individuals put on those appearances, as well as the greater part of those which are kept in captivity. (Temminck.)

Localities.—Very abundant in the Orcades and Hebrides; common in its double passage on the coasts of Holland, France, and England; lives in the north; never or very accidentally found in the interior, or on fresh waters; rather rare in the Mediterranean. (Temminck.) Common in many parts of the north of Europe, but does not appear to extend, at least in any considerable numbers, to very high latitudes, as Captain Sabine, in his 'Memoir of Greenland Birds,' states that it was only once seen in Baffin's Bay, and Dr. Richardson never mentions it. Met with, but by no means plentifully, upon most of our coasts, usually alone or in pairs, and rarely in a flock of more than eight or ten together. (Selby.) America (near Philadelphia), not very rare. (C. L. Bonaparte.) United States. (Audubon.)



Larus marinus. (Great Black-backed Gull, adult, in winter plumage.)

Food, Habits, Reproduction.—Fish, living or dead, fry, carrion, &c., form the food of this species, according to Temminck, who adds, that it rarely feeds also on bivalve shell-fish. 'It is,' says Selby, 'of very voracious appetite, and preys upon all kinds of animal substance that may happen to be cast on shore. It also keeps a close watch upon the lesser gulls, whom it drives from any food they may have discovered, appropriating the whole to itself.' Montagu notices the damage it does to fishermen by severing and devouring the largest fish from their hooks, if left dry by the ebbing of the tide. Flight slow, but buoyant. Cry strong and hoarse, to be heard from a great distance when the bird is on wing, and most frequent in the spring and breeding season. Very wary; keeping by the shores of the sea, which it only quits accidentally. *Nest* on the rocks, Temminck says, in the regions of the Arctic Circle. (Quære tamen; and note, Captain James Ross ('Last Expedition of Sir John Ross') does not mention it.) *Eggs* three or four, very deep olive green, with great and small blackish-brown spots (Temminck). Like those of the *Herring* and *Lesser Black-backed Gulls* in colour and markings, but are larger. (Selby.) The author last quoted says that its breeding stations in Britain are the Steep-holmes and Lundy Islands in the Bristol Channel, Souliskerry in the Orkneys, the Bass Island in the Frith of Forth, and one or two other stations upon the Scottish coast. Mr. Gould says that it also breeds in the marshes at the mouth of the Thames, making a nest on the ground of reeds, rushes, and flag-leaves.

Lestris. (Catarractes, Ray? Catarracta, Aldrov.?)

Generic Character.—*Bill* moderate, hard, strong, cylindrical, very compressed, hooked at the point, the *upper mandible* covered with a *cere*, the under mandible with an angle on the inferior edge. *Nostrils* approaching the point of the bill, diagonal, narrow, closed on their posterior part, and pervious. *Tarsi* long, naked above the knee. *Feet* having three toes before, entirely palmated; hind *toe* very small; *nails* large and hooked. *Tail* slightly rounded, two middle feathers elongated. *Wings*, first *quill-feather* longest. (Gould.)

Example, *Lestris parasiticus.*

Old of both Sexes in Perfect Plumage.—Front whitish; on the summit of the head a sort of hood of blackish-brown, terminating at the occiput; throat, region below the eyes, all the neck, the breast, the belly and abdomen, pure white; on the flanks some ash-coloured undulations; lower coverts of the tail, back, wings, and caudal feathers, uniform very deep ashy-brown, graduating into blackish on the end of the quills and tail-feathers; the two long tail-feathers terminated in a loose point (en pointe très-effilée); base of the bill bluish, point black; iris brown; feet deep black. Length 14 or 15 inches; the long feathers exceed from 3 to 5 or 6 inches. (Temm.)

In this state M. Temminck considers it to be *Larus parasiticus*, Linn., Gmel.; *Cataracta parasitica*, Retz; *Stercorarius longicaudus*, Briss., *Le Labbe à longue queue*, Buff.; *Stercoraria di coda longa*, 'Stor. degl. Ucc.;' *Die Polmonte*, Lepechin; *Struntmeve*, Bechst.; *Arctic Bird*, Edwards; *Arctic Gull*, Latham.

Middle Age.—All the upper parts spotless ashy-brown; lower parts a shade brighter, equally spotless; interior base of the quills and the upper part only of the caudal feathers pure white, the rest blackish-brown; the two long feathers gradually diminishing towards the end, which is terminated in a very loose point; bill and feet as in individuals with perfect plumage.

In this state the bird is *Larus crepidatus* of the first edition of M. Temminck's 'Manuel;' *Le Stercoraire* of Brisson; *Le Labbe ou le Stercoraire* of Buffon, especially Pl. Enl. 991, and more especially Edw., t. 149. (Temm.)

Young of the Year at the time of their leaving the Nest. Top of the head deep grey; sides and upper part of the neck bright grey, sprinkled with brown longitudinal spots; a black spot before the eyes; lower part of the neck, back, scapulars, small and great coverts of the wings, umber-brown, each feather being bordered with yellowish-brown, and often with reddish; lower parts irregularly variegated with deep brown and yellowish-brown on a whitish ground; abdomen and tail-coverts striped transversely; quill and tail feathers blackish, white at their base and internal barbs, all terminated with white; tail rounded only; base of the bill yellowish-green, black towards the point; tarsi bluish-ash; base of the toes and membranes white, the rest black; posterior nail often white. (Temm.)

In this state M. Temminck considers the bird to be *Larus crepidatus*, Gmelin; *Catarracta* (Catharacta) *Cepphus*, Brunnich; *Le Labbe ou Stercoraire* of authors; *Labbe à courte queue*, Cuv.; and *Black-toed Gull** of Latham and Pennant.

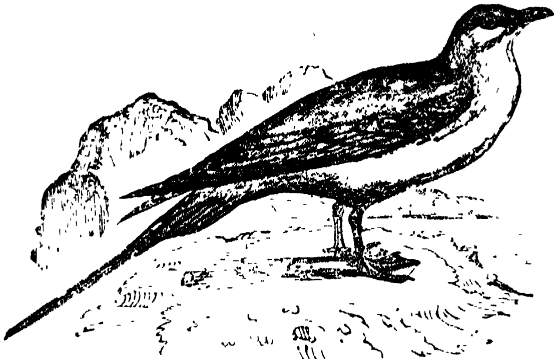
Mr. Gould, whose figure we have copied, says that he believes the bird in question to be the true *parasiticus* of Linnæus, Buffon, and Temminck; and although Mr. Gould thinks it probable that the species undergoes variations in plumage similar to those of *Lestris Richardsonii*, he is by no means able, from his own knowledge, to state this to be the case, as in all the specimens which he had opportunities of examining the markings were clear and decided, the birds exhibiting a well-defined, dark-coloured cap on the head, light under parts, and very long middle tail-feathers.

Localities.—Shores of the Baltic, Norway, and Sweden; spreads itself habitually in the interior on lakes and rivers; of periodical or accidental passage in Germany, Holland,

* The individual described by Willughby as *The Great Black and White Gull* (*Larus niger maximus Clusii*), and hereinbefore noticed, seems to have been in this stage of plumage, or rather more varied. Willughby took 'a plaice entire' out of its stomach. He also mentions another (which he supposes was a young one) with the head and neck party-coloured of black and white and the back and wings paler.

* Yr Wylan ygafr of the antient British.

France, and Switzerland, where the young only ordinarily are seen: the old rarely wander. (Temminck.) 'In its young state, as the Black-toed Gull (*Larus crepidatus*) of authors, this species,' writes Mr. Selby, 'is not of unfrequent occurrence, during the autumnal months, upon the northern coast of England, to which it is attracted by the Gulls that follow the shoals of herring on their approach to the shallows for the purpose of depositing their spawn. Like the other Skuas, it obtains the greater part of its subsistence by continual warfare on the above-mentioned birds, vigorously pursuing and harassing them till they are compelled to disgorge the food previously swallowed. In this occupation its dark plumage and rapid flight are certain to attract the attention of the spectator: and there are few probably who have visited the coast of Scotland and the northern districts of England who have not witnessed and admired the aërial evolutions of the *Teazer*, and the distress of its unfortunate objects of attack. It is but very rarely met with beyond the precincts of the Shetland and Orkney Isles in its adult state, and only one instance has occurred within my own observation, namely, on an excursion to the Fern Islands in the month of May, when two of these birds flew ahead of the boat in a northerly direction, and which were perfectly distinguishable by their lengthened and slender middle tail feathers, and the black and white of their plumage. This Skua does not appear to be a permanent resident in any part of the British dominions, for Low, in his *Fauna Orcadensis*, describes it as a migratory bird, arriving there and in Shetland in May, and departing in autumn, or as soon as the duties of reproduction have been effected.' Mr. Gould says that he has not been able to ascertain whether it breeds among the British Isles, and adds, that it is certainly of rare occurrence. Its natural habitat, he thinks, is more confined to the North, namely, the shores of the Baltic Sea, Norway, and the Polar regions. All our Arctic voyagers mention it, down to Captain James Ross inclusive; and it appears to be common to the Polar seas of Europe and America.



Lestris Parasiticus (Arctic Jager).*

Food, Habits, Reproduction.—The account given by Mr. Selby above will prepare the reader for the principal source whence this and other *Jager Gulls* derive their subsistence, namely, by pursuing and buffeting the peaceable gulls and compelling them to render up the produce of their toils. But they also feed on fish, insects, and worms, and Temminck particularly mentions the *Janthina*, or Oceanic Snail, as forming a part of its sustenance. In truth no animal substances seem to come amiss to it. Mr. Richards, of H.M.S. Hecla, saw this bird feeding on the bodies of some young children whose graves of ice had vanished, on the thaw, near Igloolik, on the 21st June, 1823. *Nest.*—Temminck says that it nestles not far from the sea-shore. Selby, who states that it breeds upon several of the Orkney and Shetland Isles, and that it is gregarious during that period, informs us that the situations selected are the unfrequented heaths at some distance from the shore, and that the nest is composed of dry grass and mosses. The eggs are two, of a dark oil-green with irregular blotches of liver-brown; and Mr. Selby adds that the bird at this time is very courageous, and, like the *Common Skua*, attacks every intruder by pouncing and striking at the head with its bill and wings. Occasionally it endeavours, according to the same authority, to divert attention by feigning lameness in the same manner as the partridge and the lapwing. In the appendix to Parry's Voyage (1819-20) this 'Arctic Lestris' is stated to be equally abundant in the islands of the Polar Sea as in Baffin's Bay. Captain Edward Sabine, who drew up the account, states that it is frequently met with inland, seeking its food along the water-courses which occupy the bottom of ravines; differing in this respect from the *Pomarine Lestris*, which is exclusively a sea-bird.

* Cataractes parasiticus, Flem.; Arctic Skua, Selby.

LARISSA. [THESSALY.]

LARKS. The reader will find, under the article FRINGILLIDÆ, a summary of the views of ornithologists as to the natural position of the *Larks*.

The subfamily *Alaudinæ* is thus characterized and developed by Mr. Swainson:—

Bill more lengthened than in any of the *Fringillidæ*; the tip entire or obsoletely notched. *Tertial quills* considerably lengthened, pointed, and generally as long as the quills. Claws very slightly curved; the claw of the outer toe always shorter than that of the inner toe; the hinder claw considerably lengthened, and either nearly straight or very slightly curved.

Alauda. (Linn.)

Bill cylindrical; *nostrils* concealed. *Wings* very long; no spurious quill; the first, second, and third quills longest, and nearly equal; the rest considerably graduated; tips of the lesser quills emarginate. *Tail* forked. Head crested. (Sw.)

Geographical Distribution. — Europe and America. (Swainson, but see below.)

Mr. Swainson considers this as the fissirostral type.

Example, *Alauda arvensis*. This is the *Alouette* and *Alouette ordinaire* and *Alouette des champs* of the French; *Lodola, Lodola canterina, Lodola di passo*, and *Lodola di montagna* of the Italians; *Feld Lerche* of the Germans; *Hedydd* and *Uchedydd* of the antient British; and *Skylark* (provincially *Larrock*) of the modern British.

The Skylark is too well known, from its inexpressibly beautiful song chanted forth far up in the air when at liberty and in its natural state, to require any description.

Food.—Insects and their larvæ, with many sorts of seeds and grain.

Nest.—On the ground. *Eggs* four or five, greenish white, spotted with brown.

Localities.—All the parts of Europe: also in Asia and the northern parts of Africa, but not in the south of that vast continent (Temm.); the whole of Europe within the temperate zone, many parts of Asia, and the north of Africa. (Selby.)

Calendula. (Linn.)*

Generic Character.—*Bill* thick, much compressed; the culmen curved and convex; the commissure arched; the tip of the upper mandible wide above and inflexed. Wings long or moderate; the first quill very small and spurious; the second nearly equal to the third and fourth; lesser quills short, emarginate. Tail slightly forked. Lateral toes equal. Africa. The dentirostral type—*C. magnirostris*, 'Os. d'Afr.,' pl. 193. (Sw.)

Subgenera:—*Myrafra*, Horsf.—Bill as in *Calendula*. Wings short, rounded; greater quills hardly longer than the secondaries and tertials; the first quill spurious, half the length of the second, which is shorter than the third; the third, fourth, fifth, and sixth equal, and longest. Tail short, even. Legs long. *M. Javanica*, 'Linn. Tr.' xiii. 159. (Sw.)

Braconyx, Sw. (Brachonyx.)—Bill as in *Calendula*. Hinder claw very short. Wings and tarsi much lengthened. Africa. (Sw.)

Agrodroma, Sw. (Anthus pars, Auct.)

Generic Character. — Bill slender, considerably compressed; both mandibles of equal length; the tip of the upper one not reflected over the lower, and with a small notch, almost obsolete. Wings long; the four first quills nearly equal; the rest rapidly diminishing, and emarginate at their tips; tertials lengthened, pointed, as long as the quills. Tail moderate, even. Legs pale, long, slender. Tarsus longer than the middle toe. Lateral toes equal, but the outer claw shorter than the inner. Colour brown, lark-like. Distribution universal. The insessorial or pre-eminent type—*Agrodroma rufescens*, 'Enl.,' 661, f. 1. (Sw.)

Generic Character.—Bill slender, compressed, thrush-

* We cannot find this genus in Linné's last edition of the 'Syst. Nat.,' nor in Gmelin.

Macronyx. (Sw.)

like, entire; nostrils large, naked, the aperture lateral. Wings short; the primaries not longer than the tertials, the four first of equal length; secondaries long, emarginate. Tail moderate, even. Feet enormous. Tarsus and hinder toe very long, and of equal length. Lateral toes unequal, the inner shortest. Africa. The rasorial type—*M. flavicollis*, 'Ois. d'Afr.,' pl. 195; *M. flavigaster*, Sw., 'Birds of West Africa.' (*Naturalists' Library*, 'Ornithology,' vol. vii., p. 215.) (Sw.)

Certhilauda. (Sw.)

Generic Character.—Bill slender, lengthened, more or less curved; nostrils round, naked. Wings very long; the first quill spurious; the three next nearly equal. Tail moderate, even. Feet lengthened; the lateral toes equal; length of the hinder claw variable, although typically short and straight. Africa. The tenuirostral type—*Certhilauda longirostra*, 'Ois. d'Afr.,' 192; *bifasciata*, Rupp., 'Atlas,' plate 5; *nivosa*, Sw., 'Birds of W. Africa.' (vol. vii., p. 213.)

Such are Mr. Swainson's views as to the arrangement of this subgenus. [FRINGILLIDÆ, vol. x., p. 483.] The genus *Anthus*, Bechst., is placed by Mr. Swainson at the end of his subfamily *Motacillinæ* (Wagtails), under his family *Sylviadæ* (Warblers).

FOSSIL LARKS.

Dr. Buckland figures a lark '(*Alauda*) r and f' among the land Mammifers and Birds of the third period of the Tertiary series, in the first plate of the illustrations of his 'Bridgewater Treatise.' He had previously noticed the remains of the lark in Kirkdale Cave. (*Reliquiæ Diluvianæ*, pp. 15, 34, plate xi, f. f. 24, 25.)

LARNICA. [CYPRUS.]

LARRIDÆ, a family of Hymenopterous insects of the section Fossores, distinguished by the labrum being either entirely or partially concealed, and the mandibles deeply notched on the inner side near the base. It contains the following genera:—1. *Palarus* (Lat.), in which the antennæ are very short, and are gradually thicker towards the apex: the eyes are closely approximated posteriorly, and enclose the ocelli: the second cubital cell is petiolated. 2. *Tachytes* (Panzer), antennæ filiform, the basal joint slightly incrassated, the rest cylindrical; superior wings with one marginal cell, slightly petiolated and three submarginal cells, the third narrow and oblique; mandibles with a dentate process on the inner side near the base. *T. pompiliformis* is about 2¼ lines in length: black, with the basal segments of the abdomen red. It is not an uncommon insect in various parts of England. 3. *Larra*: this genus differs from *Tachytes* (which is *Lyrops* of Illiger) in having no tooth on the inner side of the mandibles at the base; the eyes not being approximated posteriorly, and the metathorax and abdomen being decidedly larger. 4. *Dinetus*: eyes converging posteriorly; antennæ filiform in the female, with the first joint incrassate, in the male larger, with a deep lateral impression, the four following joints submoniliform, and the five next slightly compressed and convoluted, the remaining three filiform; superior wings, with one appendiculated marginal cell, and three submarginal cells. But one species of this genus has been found in England. 5. *Miscophus* (Jurine) has one marginal cell, which is not petiolated, to the superior wing, and two submarginal cells, the second being petiolated; the antennæ are filiform in both sexes. There is but a slight projection at the base of the mandibles. *M. bicolor* (Jurine) is the only species found in England, where it is apparently rare. (Shuckard's 'Essay on the indigenous Fossorial Hymenoptera.')

LARUNDA. [LÆMODIPODA.]

LARVA, a term applied to that state in which an insect exists immediately after its exclusion from the egg, and which precedes the pupa state. The animals commonly called *Grubs*, *Maggots*, and *Caterpillars* are larvæ. Grub appears to be a general term analogous to larva; the term maggot is most generally applied to the larva state of Dipterous insects; and caterpillar, in the most common acceptation of the term, is used to designate the larva state of Lepidopterous insects. These three terms however are used in a very vague manner.

The most striking difference perhaps which exists between the larva and the perfect insect consists in the superior powers of locomotion and consequently better developed skeleton possessed by the latter.

Though larvæ never possess wings, they vary much as regards the development of the locomotive organs, and as these are more or less perfect, so does the larva resemble or recede from the insect in its imago state. Hence Messrs. Kirby and Spence divide larvæ into two sections: those which, in general form, more or less resemble the perfect insect; and those which are unlike the perfect insect. The larvæ of both sections moult, or cast their skin, several times during their progress to maturity; the number of moults varies according to the species, and the period intervening between the moults depends upon the length of the insect's existence in the larva state. In these moults, not only is the whole external covering of the insect cast, but even the lining of the intestinal canal and of the tubes of the tracheæ is shed.

The greater portion of the larvæ of the orders *Orthoptera*, *Hemiptera*, and *Homoptera*, excepting that they have no wings, bear a considerable resemblance to the perfect insect, and hence belong to the first of the sections just mentioned. As however the muscles which serve to support and give motion to the wings are attached to the skeleton of the thorax, so, as might be expected, we find this part in the perfect insect more unlike that of the larva perhaps than any other; and again where (as in the imago state of *Scutellera*) a portion of the thorax is greatly produced behind and serves to protect the wings when folded,—the larva, having no wings, does not possess this peculiarity.

Belonging to the second division, in which the larva does not resemble the perfect insect, are the orders *Hymenoptera*, *Coleoptera*, *Neuroptera*, *Lepidoptera*, and *Diptera*.

The larvæ of Hymenopterous insects are usually of a short ovate form, and soft and fleshy substance, devoid of legs or distinct head, and the body lies in a bent position. In the *Tenthredinetæ* (Latreille) however we have a remarkable exception, the larvæ of these insects not only being furnished with six legs attached to the thoracic segments, but also possessing a great number of prolegs.* These prolegs are usually sixteen in number, and attached in pairs to the abdominal segments; in some there are but fourteen, and in others only twelve prolegs. The larvæ of the *Tenthredinetæ* very much resemble those of Lepidopterous insects, but differ in the greater number of their prolegs; the head is large, rounded, flattened in front, and vertical in position; the body is always bent under, and when touched they roll themselves up like the Iuli. In the genus *Pamphilius* (Lat.), the larva possesses six thoracic legs, but no prolegs.

The larvæ of the Coleoptera are most commonly of an elongate, cylindrical, or slightly depressed form; the thoracic segments are almost always provided with six legs, and there are seldom any prolegs on the abdominal segments. The head is furnished with *mandibles*, *maxillæ*, *labrum*, *labium*, and *antennæ*, and very frequently with *ocelli*. The parts of the mouth and the *antennæ* however do not resemble those of the perfect insect. The antennæ are usually very small and composed of but three or four distinct joints. The ocelli of the larva are replaced by compound eyes in the perfect insect. The thoracic segments are often protected by a horny plate on the upper surface: the prothorax, which is usually the largest, is generally so protected. The legs, of which these segments have each a pair, are of moderate size in most larvæ of this order, and composed of a *coxa*, *trochanta*, *tibia*, and *tarsus*; the last however appears to be represented by a small jointless claw. The body is often soft, but sometimes, like the thorax, protected by horny plates, as in some of the Carabidæ, Silphidæ, &c. In the *Carabidæ*, *Staphylinidæ*, and indeed many families, it is somewhat depressed. In many of the Heteromerous insects it is cylindrical, of a coriaceous texture throughout, and the terminal segment is often furnished with horny appendages at the apex, and one or two prolegs beneath. The larvæ of many of the *Elaterides* are also of a coriaceous texture and cylindrical form, and the terminal segment of the abdomen is generally furnished with horny appendages. These appendages are indeed very commonly met with in Coleopterous larvæ. In those species belonging to the sections *Lamellicornes*, *Rhyncophora*, and *Longicornes*, however, we have not met with them, and the body is always of a soft and fleshy texture. The larvæ of the two last-mentioned sections have extremely minute legs.

Order *Neuroptera*.—In this order the larvæ very much resemble in general appearance many of those of the order

* The prolegs are fleshy, without joints, and, when they occur, are found attached to the abdominal segments, in these respects differing from the true legs, which are horny and jointed, and attached to the thoracic segments.

Coleoptera: they always possess six thoracic legs, but seldom any prolegs. In the case-worms (*Trichoptera*) and some others there are a pair of prolegs attached to the terminal segment of the abdomen.

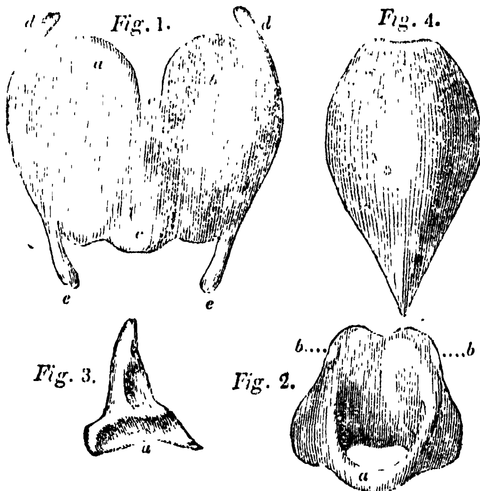
Order *Lepidoptera.*—Here the larvæ (or caterpillars) are soft and fleshy, and usually of a cylindrical form. They possess six thoracic legs and generally ten prolegs. The prolegs vary in number, and are attached in pairs to the under side of the abdominal segments; but none are ever found on the fourth, fifth, tenth, or eleventh segments. In the larvæ of the *Geometræ* there are but four prolegs, two of which are attached to the anal segment, and the other two to the ninth. Some of the *Tinnæ* have but two prolegs, and these are anal. In the genus *Apoda* (Haworth) the larvæ have no distinct prolegs, but in their stead a number of small transparent shining tubercles, without claws. 'The prolegs of almost all Lepidopterous larvæ are furnished with a set of minute, slender, horny hooks, crotchets, or claws, of different lengths, somewhat resembling fish-hooks, which either partially or wholly surround the apex like a palisade. By means of these claws, of which there are from forty to sixty in each proleg, a short and a long one arranged alternately, the insect is enabled to cling to smooth surfaces, to grasp the smallest twigs to which the legs could not possibly adhere; a circumstance which the flexible nature of the prolegs greatly facilitates.' 'When the sole of the foot is open, the claws with which it is more or less surrounded are turned inwards, and are in a situation to lay hold of any surface; but when the animal wishes to let go its hold it begins to draw in the skin of the sole, and in proportion as this is retracted the claws turn their points outwards, so as not to impede its motion.' (Kirby and Spence's *Introduction to Entomology*.)

The larvæ of Dipterous insects are for the most part soft and fleshy, and without legs; none have true jointed legs: some however have prolegs. The head is usually soft and indistinct, but in certain species the head is somewhat corneous, and of a determinate shape.

LARVA'RIA, the name of an obscure group of tertiary fossils, proposed by M. Defrance. (Blainville, *Actinologie*, p. 442.)

LARYNGITIS. [CROUP.]

LARYNX is the organ of the voice; its frame-work is composed of five cartilages, which are capable of being moved on each other in various directions by muscles, so as to act upon two elastic bands, on which the voice essentially depends, and which are called the vocal ligaments.



The first, the thyroid cartilage (*fig.* 1), consists of two plates (*a*, *b*) of dense, tough, fibro-cartilaginous substance, of an irregularly quadrilateral form, which are united at the lower part of their anterior edges (*c*, *c*) at an angle of about 60°. The prominence of this angular union is felt in the front of the throat, forming what is called the Pomum Adami; at the sides of and behind which the form of the cartilage may be easily traced out with the fingers. The posterior edge of each plate bears at each angle a process or horn (*d*, *d*, *e*, *e*), by which the thyroid cartilage is attached by ligaments above to the hyoid bone, and below to the cricoid cartilage.

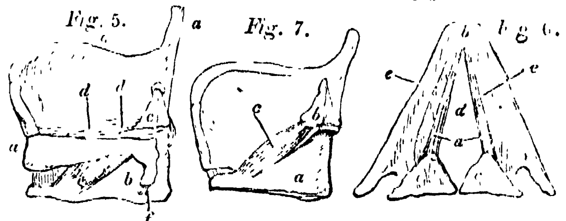
The cricoid cartilage (*fig.* 2) has somewhat the form of a signet ring. It is enclosed within the angle of the thyroid cartilage, beneath whose lower edge the front and narrowest portion (*a*) of its ring may be felt, with an interval of about a quarter of an inch between them. It has an articulating surface on each side, by which it is moveably connected with the inferior horns of the thyroid cartilage; and two other smooth convex surfaces (*b*, *b*), on its upper and posterior edge, by which it is articulated with the two arytenoid cartilages.

The arytenoid cartilages have each the form of an irregular triangular pyramid (*fig.* 3). They are placed upon the upper edge of the broad part of the cricoid cartilage, just within the most expanded part of the angle formed by the receding plates of the thyroid. The base (*a*) by which each is articulated with the cricoid is slightly concave, perfectly smooth, and capable of moving to a certain extent in every direction.

The epiglottis (*fig.* 4) is of a somewhat ovate form. It is attached by its apex to the angle of union of the plates of the thyroid cartilage, and projects obliquely backwards and upwards over the cricoid and arytenoid cartilages like a shield, guarding them from the contact of foreign bodies passing from the mouth.

These cartilages are connected chiefly by elastic ligament which is arranged in bands of varying thickness throughout the whole of the larynx; uniting the upper edge of the thyroid cartilage to the os hyoides, and its lower edge to the cricoid cartilage; passing also from the arytenoid cartilages to the epiglottis, and uniting the rings of the trachea and bronchi; affording to all a firm but yielding connection, and endowing them by its elasticity with the power of resounding in accordance with the vibrations originating in the vocal ligaments.

The vocal ligaments are two narrow bands of highly elastic tissue, stretched between the anterior angle of the thyroid and the anterior surfaces of the arytenoid cartilages. The substance of which they are composed is a yellowish, dense, fibrous tissue, which is placed in those parts of the body where a permanent elasticity is required, as in the spaces between the laminæ of the vertebræ, the coats of arteries, the rings of the trachea, &c. In *fig.* 5, a profile



view of the right vocal ligament is drawn: *a*, *a*, *a* is the outline of the thyroid cartilage, of which part of the left side is removed; *b* is the cricoid cartilage, and *c* the arytenoid cartilage of the right side; *d*, *d* is the vocal ligament. In *fig* 6, the view of the vocal ligaments *a*, *a* is taken as seen from above; they are attached anteriorly to the inside of the thyroid cartilage at *b*, and posteriorly to the front of the arytenoid cartilages *c*, *c*. Between them is the aperture through which we breathe, the glottis *d*. It is bounded posteriorly by the inner edges and anterior angles of the arytenoid cartilages; anteriorly by the inner edges of the vocal ligaments. When at rest, as during quiet breathing, the glottis is of a somewhat lanceolate form (*fig.* 11, as outlined by the dots), but when speaking or singing it is very much narrowed (*fig.* 11, the continued lines).

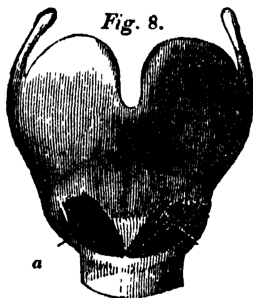
The muscles acting on the parts of the larynx just described are arranged symmetrically and attached to corresponding points on each side of the larynx; and their names are compounded of those of the cartilages on which they are inserted, as follows.

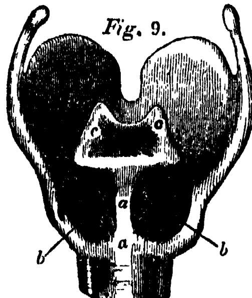
The crico-thyroideus (*fig.* 8, *a*, *a*, and *fig.* 5, *e*) is attached on each side, at one of its extremities, to the upper edge of the narrow front part of the cricoid cartilage; and at the other, to the lower edge of the thyroid, just before its lower horn. Its fibres are directed upwards and backwards, and its immediate action would therefore be to approximate the adjacent edges of the thyroid and cricoid cartilages. But the thyroid is fixed on each side by a ligament passing from its inferior horn to the side of the broad part of the cricoid (*fig.* 5, *f*), and the crico-thyroid muscle will there-

fore produce a rotatory motion of the cricoid cartilage around the horizontal axis drawn through *f*. When the anterior edge of the cricoid cartilage is thus raised towards the anterior angle of the thyroid, its posterior and upper part will be moved backwards and downwards to a greater distance from the front of the thyroid; and if the arytenoid cartilages be fixed on the top of the cricoid, they will of course move with it in the same direction. The distance between their anterior edges and the angle of the thyroid (see *fig.* 5) will thus be increased, and the vocal ligaments (*d*, *d*), which are attached to those points, will be proportionally stretched.

The thyro-arytenoidei (*fig.* 6, *e*, *e*) are attached anteriorly by the sides of the angle of the thyroid cartilage to the outer side of, and above, the vocal ligaments, and posteriorly to the anterior angles and outer edges of the arytenoid cartilages. Their simplest action will therefore be to approximate the same points which the preceding muscles render more remote; they will thus shorten and relax the vocal ligaments. Some of their fibres extend on each side for a short distance above and below the vocal ligaments; those below have the power of narrowing the access to the glottis, while those above the ligaments may compress together the sides of the larynx directly over the glottis. Lastly, there are other fibres which are attached to the outer edges of the vocal ligaments themselves.

The crico-arytenoidei postici (*fig.* 9, *b*, *b*) are attached to





the posterior surface of the cricoid cartilage (*a*, *a*), and pass obliquely outwards, to be inserted into the outer angle of the arytenoid cartilages. In contracting therefore, if the arytenoid cartilages be moveable, they will draw their anterior angles outwards, and thus increase the width of the glottis; but if the arytenoid cartilages be fixed by other muscles, the crico-arytenoidei postici will merely draw them backwards and stretch the vocal ligaments.

The crico-arytenoidei laterales (*fig.* 7, *c*) are attached on the one hand to the inner sides of the cricoid cartilage (*a*), and on the other to the outer angles of the arytenoids (*b*); they rotate the latter inwards, so as to approximate their front portions and narrow the anterior part of the glottis.

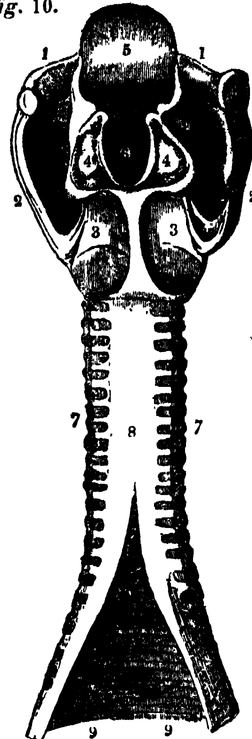
The posterior arytenoid muscles (*fig.* 9, *c*, *c*) lie behind the arytenoid cartilages, and consist of fibres passing transversely and obliquely from one to the other. They therefore simply approximate these bodies, and narrow or close the back part of the glottis.

The simplest actions of all these muscles in regard to the voice may therefore be thus stated: the crico-thyroidei stretch the vocal ligaments; the thyro-arytenoidei relax them; the crico-arytenoidei postici open the glottis; the crico-arytenoidei laterales and the arytenoidei postici narrow or close it.

A band of muscular fibres may be also mentioned as passing from the arytenoid cartilages to each side of the epiglottis, and thus serving to draw down the latter so that it may cover the glottis more closely than when left to its own elasticity.

Below, the larynx opens into the trachea (*fig.* 10, 8), which is continued into the chest, and there divides into two branches, the bronchi, whose ramifications and terminations form the air-passages and air-cells of the lungs. The lungs, being exactly contained in the cavity of the chest, are compressed by the contractions of its walls. The walls of the chest are therefore the power by which the air is forced from the lungs through the glottis, for the production of the voice, and it is by their more or less powerful contraction that the various degrees of intensity of the same note are produced. The trachea is composed of a series of cartilaginous incomplete rings, which are united behind by muscular fibres, and are connected together by longitudinal elastic bands. It is thus capable of variations both of length, breadth, and tension; and of entering into vibrations with the column of air contained in it, and of assisting in communicating those vibrations through its branches to the walls of the chest.

Fig. 10.



1, 1, Os hyoides; 2, 2, Thyroid cartilage; 3, 3, Cricoid cartilage; 4, 4, Arytenoid cartilages; 5, Epiglottis; 6, Aperture of communication between glottis and pharynx; 7, 7, Rings of trachea; 8, Situation of transverse posterior muscular bands; 9, 9, Portion of trachea cut open from behind.

At the upper part of the trachea the windpipe gradually narrows towards the glottis (see view of its section in *fig.* 12); and above the glottis it suddenly dilates, so that the edges of the elastic vocal ligaments stand out from the wall of the larynx, and have space in which they may vibrate freely, like the lips in the mouthpiece of a trumpet. About half an inch higher the passage again contracts, so as to form a narrow recess on each side, directly above the vocal cords. This is called the ventricle of the larynx, and the prominent bands above it are called the false vocal cords, or the upper ligaments of the larynx. They are formed of elastic tissue, like the inferior or true vocal ligaments, but in less quantity, and mixed with fatty tissue, so that they do not vibrate so freely. The walls of the ventricle are capable of being approximated by some of the fibres of the thyro arytenoid muscles, which are thinly distributed upon them; and thus the recess may be nearly obliterated, and the upper ligaments brought almost into contact.

The highest part of the larynx is formed by two folds of membrane passing from the arytenoid cartilages to the epiglottis (*fig.* 10), forming an oval aperture which admits of variations of size by the action of the muscles already mentioned. At this aperture the larynx communicates with the upper and most expanded part of the pharynx, the cavities of the mouth and nose, and the frontal and other sinuses which open into the latter. These sinuses are walled round by bone, but the pharynx, and its communications with the mouth and nose, as well as the external apertures of the two latter cavities, are in great part muscular, and may be thus subject at will to alterations of form, size, and tension.

The larynx has been compared to a variety of musical instruments, and it will be seen that in its different parts it unites the principles of several. In its essential vocal apparatus it most nearly resembles the reed instruments, as the reed-pipes of the organ, the clarionet, &c., or rather a modification of them, in which the vibrating body is not fixed in its dimensions as a metallic tongue, or a reed, but consists of a lamina of elastic membrane, capable of varied degrees of tension, as well as of alterations in its

length. No musical instrument has yet been constructed on this principle, unless we consider as such the various kinds of trumpet in which the vibrations are produced by the air impelled against the edges of the lips, rendered more or less tense by the action of their orbicular muscle. The principle has been applied in the formation of artificial larynges by Biot, Cagniard de la Tour, Willis, &c., who have chiefly used caoutchouc membrane; and by Müller and Henle, who have employed besides, either the vocal ligaments themselves, or laminæ of the elastic coat of an artery. The most complete examination of the subject is that made by Müller, and published in the first part of the second volume of his 'Physiologie des Menschen.'

It is evident that by adapting to one of the open extremities of a tube two portions of thin elastic membrane, so that their opposite edges leave a narrow space in the middle, through which the air blown into the other end of the tube may pass and excite vibrations, one obtains an imitation of the essential vocal apparatus of the larynx; the trachea being replaced by the tube, the vocal ligaments by the bands of elastic membrane, and the glottis by the space between them, while the parts above the glottis may be imitated by adapting tubes of different sizes and forms above the membranes.

In such an apparatus Mr Willis found (*Cambridge Philosoph. Trans.*, 1832) that in order that two laminæ of elastic membrane enclosing a narrow interval should produce sound, the parts near their edges must be parallel to each other. Applying this law to the case of the larynx, he observes that something more is necessary for speaking or singing than a certain degree of tension of the vocal ligaments, for they are always more or less tense; and even when their tension is increased, and all the cartilages are in the position for producing sound, we may yet breathe quietly, the edges of the vocal ligaments not being parallel.

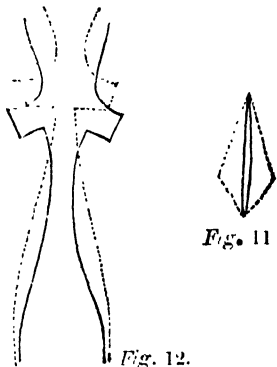


Fig. 11

Fig. 12.

Fig. 12 represents two vertical transverse sections of the larynx, the continued line indicating the position of its parts when not sounding, the dotted line the same parts in the vocalizing position, in which the edges of the ligaments are parallel to each other. Mr. Willis considers it to be one of the functions of the thyro-arytenoid muscle to place the ligaments in this essential position.

When the vocal ligaments are thus placed, the modulations of the notes are effected by changes in their length and tension; for, like those of other elastic membranes stretched at both ends, they follow in many respects the same laws as cords [CORD.] Thus, the degree of tension being the same, the height of the note is inversely as the length of the membrane; and the length being the same, the height of the note, as expressed by the number of vibrations, is directly as the square root of the power employed in producing the tension. The application of these laws to the vocal ligaments was experimentally proved by Müller. In a part of his experiments on the dead larynx he succeeded in producing the complete scale of notes and half-notes through a range of 2½ octaves, by gradually increasing the tension of the vocal ligaments by weights appended to one of their extremities. The weights produced extension in the same direction in which the crico-thyroid muscles act, when, the arytenoid cartilages being fixed, they throw them backwards with the cricoid as already explained. If instead of stretching the vocal ligaments they were left to their own elasticity, or still more relaxed by artificial means, in imitation of the action of the thyro-arytenoid muscles, still lower notes could be produced.

In the course of these experiments Müller found that the tones of the dead larynx, which in the lower notes closely resembled the chest-notes of the human voice, were very apt, as they ascended in the scale, to assume the characters of the falsetto voice. He was thus led to discover the mode in which the latter class of notes (whose origin had long been the subject of great doubt) is produced. In sounding the chest-notes and in the common voice of speaking, the whole vocal ligaments vibrate, and with them part of the ventricles, and of the thyro-arytenoid muscles; but in the falsetto notes it is only the thin edges of the ligaments which are thrown into vibrations. He found also that he could prevent the tones of the chest-notes from breaking into those of the falsetto, as he ascended in the scale, by compressing the part of the larynx immediately below the glottis, in imitation of the action of the lower fibres of the thyro-arytenoid muscles.

As in all reed instruments, the velocity of the current of air exciting the vibrations of the vocal ligaments has an influence on the note produced; thus Müller found that the natural note of the vocal ligaments at a given tension could be raised to its fifth by blowing with increased force. He believes that in singing the same note with varied degrees of force a compensation is effected by lessening the tension of the ligaments in the same proportion as the velocity of the current is increased; but it seems more probable that the tension of the ligaments is always the same for the same note, while it is the office of the epiglottis to prevent the notes from rising with the increased force of the air. It may effect this on a principle discovered by M. Grenié (Magendie's *Précis de Physiologie*, i. 253), who found that to remedy the inconvenience arising from the ascent of the note when the current of air blown into a reed organ-pipe was increased, it was sufficient to place within the pipe directly over the reed a supple elastic tongue, which shielded it very nearly in the same manner as the epiglottis covers the vocal ligaments.

Müller found that sounds were most easily produced from the dead larynx when the anterior angles of the arytenoid cartilages were in contact, so that only that part of the glottis was open which is bounded by the vocal ligaments. The tension of the ligaments being fixed, the same note could be produced whether the glottis were widely open or nearly closed; but it is probable that, though not essential, the varying apertures of the glottis are auxiliary to the complete and pure sounds of the different notes; for Magendie (l. c., p. 247) distinctly saw it become narrower as the notes emitted by a dog were higher; and in singing high notes one clearly feels that the air passes through a narrower aperture and with more difficulty than in singing the low notes.

The notes produced at the glottis are subjected to modifications in timbre, strength, and purity, by the parts connected with the larynx both above and below the vocal ligaments. To illustrate this, one need only refer to the difference of tone which may be drawn from a clarionet-reed when it is only attached to the mouth-piece, and when the mouth-piece is fixed on the body of the instrument. This part of the subject has been particularly illustrated by M. Savart, Mr. Wheatstone, and Mr. Bishop. It is well known that in all reed-instruments, unless the tube or body be adapted to the reed so as to be capable of the same number of vibrations as it is, there is always a discordance of sounds. If for example the tube be unalterable in length, while the reed is capable of varied modifications of pitch, the sounds will be irregular in intensity, and in some parts of the scale will be totally extinguished. Thus it is that in organs, in each pipe, the tongue and the tube have to be adapted to each other, and that in clarionet-playing much of the perfection of the tone depends on the adaptation of the pressure of the lips on the reed to the length of the tube as determined by the number of holes covered by the fingers. Savart (*Journal de Physiologie*, t. 5) has shown that if the walls of the tube, instead of being fixed in their dimensions like those of reed-instruments, be capable of varying degrees of tension, an extraordinary variety and fulness of notes may be produced; and that the shrill whistle of the bird-call (with which he compared the larynx) is, with the same essential principle for the original formation of sound, converted into a full round tone. In the human body such a tube exists on both sides of the glottis, and is in both parts capable of varieties in tension, size, and form. Thus the trachea may be acted on by its posterior muscles and its

elastic bands; and to a far greater extent the parts above the glottis will vary in their conditions. In singing an ascending scale of notes, if the finger be placed in the interval between the angle of the thyroid cartilage and the front of the hyoid bone, it will be found that as the notes emitted become higher the interval diminishes and the whole larynx rises. Thus the tube above the glottis is shortened, just as in all wind-instruments the body is shortened by opening the holes at their sides, or by pushing one part of the tube within another. At the same time the lips are drawn in and compressed, the arches of the palate approximated, the uvula tightened, the back of the tongue and soft palate drawn near each other, and the oval aperture into the larynx constricted, all tending together, by a diminution of the size and an increase of the tension, to accord with the diminished length of the tube, that their vibrations may be in correspondence with those of the vocal ligaments. As the voice passes through the descending scale, the opposite changes occur; the vocal ligaments lengthen and are less tense, the larynx descends, the cavity of the mouth is expanded, and all the tissues are relaxed. Hence it is that the singer, when his voice is exerted in its highest notes, feels the greatest fatigue in the parts about the palate and pharynx; while in singing the lower notes he remains unwearied far longer, and at last feels fatigue chiefly in the muscles of the chest.

It is difficult to determine the circumstances on which the differences of the timbre of the voice in different persons depend. The difference between the male and female voices is probably owing to the comparative shortness of the vocal ligaments in the latter. According to Müller their average length in man is 18½ millimetres, in woman only 12¾, or nearly as 3 to 2. But to account for the differences of tenor and bass, or of soprano and alto voices, no good evidence has yet been collected. The average compass of the voice is two octaves, but in different parts of the scale in different persons; thus a bass voice commonly has its lowest note four or five notes lower than a tenor, while a tenor has its highest note from four to five notes above the highest note of the bass voice. A soprano voice again has its lowest note at nearly the same part of the scale as the highest note of a bass voice; and thus the whole compass of the human voice, from the lowest of the bass to the highest of the soprano, would be nearly four octaves. The voices of children resemble very nearly those of women, but in males a remarkable change takes place at puberty, when the voice is said to crack; the change from the shrill treble voice of the boy to the fuller and rounder tone of the man is sometimes perfected almost suddenly; but in most cases it is for some time in progress, wavering between the two extremes, deep and manly during quiet enunciation, but when any exertion is used, suddenly starting up again to the shrill tones of boyhood. In old age, the cartilages of the larynx becoming bony, the ligaments hard and unyielding, and its muscles pale and powerless, the voice completely alters; it trembles as if there were not sufficient strength in the muscles to maintain a due tension of the vocal ligaments; it becomes harsh and monotonous, and

> 'Turning again towards childish treble,
> Pipes and whistles in the sound.'

Much yet remains unknown of the actions of the various parts of the larynx, but enough has been said to prove that it is perhaps the most perfect piece of complex mechanism in existence. Judging of it, as we must do, by comparison with the imperfect contrivances of art, it is not possible that we should be able to discern all the beauties of an instrument which in a space of about six inches by two produces a range of notes of between two and three octaves, all of perfect clearness and harmony, and with a tone far superior to any yet known—which is capable at the same time of giving a wide range of expression, and varied degrees of power—of executing difficult and intricate passages with the greatest rapidity and distinctness—and which above all will last for years without need of repair, and is even improved by a judicious use. The larynx fulfils all this, and is besides subservient to other functions of vital importance to the whole body. In breathing for example, its exquisite sensibility is immediately excited by the contact of any foreign substance, or of a deleterious gas, and the glottis is firmly closed by the thyro-arytenoid muscles, to prevent the entrance of the noxious body into the lungs. The same action occurs as we swallow each portion of our food, to prevent any of it passing into the lungs; and if a particle by accident touch the glottis, coughing is excited to ensure its speedy removal. Again, when about to make a violent exertion, a man first draws a full breath, and fixes his chest that he may have a firm support for all the muscles of his limbs; the same little muscles assist in this action by closing the glottis, and thus preventing any portion of the air from being forced from the chest, however great the exertion of the muscles attached to its walls.

LA'SCARIS, CONSTANTINE, a descendant of the imperial family of that name, emigrated from Constantinople at the time of the Turkish conquest to Italy, where Francesco Sforza, duke of Milan, entrusted him with the education of his daughter Ippolita, who married Alfonso duke of Calabria, son of Ferdinand king of Naples. Lascaris afterwards went to Rome and Naples, where he taught Greek and rhetoric. He lastly repaired to Messina, where he was treated with great distinction, and where he died towards the end of the fifteenth century, leaving his valuable MSS. to the senate or municipal council of Messina. Those MSS. were afterwards transferred by the Spaniards to the Escurial Library.

Lascaris published a Greek Grammar, Milan, 1476, which was afterwards translated into Latin, and went through several editions at Venice from the Aldine press, under the title of 'Compendium octo Orationis Partium,' &c. He also wrote two Opuscula on the Sicilians and Calabrese who had written in Greek, which were published by Maurolico in 1562, and also a 'Dissertation on Orpheus,' printed long after in the first volume of the 'Marmora Taurinensia.'

LA'SCARIS, ANDREAS JOHANNES, of the same family, but somewhat younger than the preceding, called Rhyndacenus, because he came from some place in Bithynia, near the banks of the Rhyndacus, left Greece at the time of the Turkish conquest, and repaired to Florence, where Lorenzo de' Medici took him under his patronage, and afterwards sent him to Greece in order to collect valuable MSS., of which Lascaris brought back a considerable number to Italy. After the death of Lorenzo, Lascaris went to France, and gave lessons in Greek at Paris. Budæus was one of his pupils. In 1503 he was sent by Louis XII. on a mission to Venice; after fulfilling which he went to Rome, where Leo X. gave him the direction of the Greek college which he had just founded. In 1518 Lascaris returned to Paris, and was employed, together with Budæus, in collecting and arranging the royal library of Fontainebleau; after which Francis I. sent him again to Venice as his ambassador. At last Pope Paul III. having pressed him very urgently to come to Rome, Lascaris set out, notwithstanding his advanced age and his infirmities; but a few months after his arrival at Rome he died, in 1535, being about ninety years of age. Lascaris published or edited the following Greek works:—'The Hymns of Callimachus,' with scholia; 'Commentaries on Sophocles;' a Greek Anthology, fol., 1494; 'Scholia on the Iliad,' and a dissertation, with the title, 'Homericarum Quaestionum et de Nympharum antro in Odyssæa Opusculum,' Rome, 1518. Some other works are also attributed to Lascaris, such as 'De veris Græcarum Literarum formis ac causis apud Antiquos,' Paris, 1536, and a collection of epigrams in Greek and Latin, Paris, 1527.

LASER, a highly esteemed gum-resin among the antients, which had become rare even in the time of Pliny, but which is described by Dioscorides (lib. iii., c. 84), and still more fully by Theophrastus, under the name of silphion (σίλφιον, lib. vi., c. 3). In the edition of Bodæus à Stapel a most elaborate dissertation may be seen, in which apparently almost everything that occurs respecting it in antient authors is brought together. Though the whole plant appears latterly to have been called silphion, this name was originally that of the root. The stem of the plant is called magúdaris (μαγύδαρις) by Theophrastus, the leaf máspeton (μάσπετον), the seed phyllon (φύλλον). These names are however differently applied by other authors. Laser was subsequently called *lasaron*, and was applied to the juice alone. This was in such high estimation as to have been sold for its weight in gold, having many marvellous properties ascribed to it, but it was probably useful only as a stimulant to some of the functions and as an antispasmodic. The country where it was produced has been clearly laid down as the Cyrenaica regio, and the physicians of Cyrene, we know, early attained a high reputation. Theophrastus gives a wider extent of distribution

along the north of Africa, stating at the same time that the greater portion was collected near the Syrtes. Dioscorides gives Syria, Armenia, Media, and Libya as the countries whence it was procured. The produce of this plant having been so valuable, it necessarily became a considerable source of revenue, and was represented on the coins of Cyrene [vol. viii., p. 265]; another is represented in the above edition of Theophrastus (p. 598) with the head of a beardless man on the obverse, while a third is described as figured in Viviani's 'Flora Libyca,' in which the figure is bearded, but in all the plant is exactly the same.

From the descriptions and representations of the plant on those coins, there can be no doubt of its being one of the Umbelliferæ, and it has successively been thought to be *Laserpitium Siler* and *gummiferum*, *Ligusticum latifolium*, *Ferula tingitana*, &c. But as the natural history of the countries becomes investigated, whence the antients obtained the substances they have described, these doubts give way to certainties, or very near approximations to the truth. Della Cella, who travelled in the Cyrenaica in 1817, having found an umbelliferous plant on the mountains of Cyrene, and the only one at all resembling the representation on the coins, would appear to have finally determined the question. This plant has been described by Viviani, in his 'Flora Libyca,' and named *Thapsia Silphion*; it is very closely allied to *T. garganica* of De Candolle, and a description of it may be seen in Dr. Lindley's 'Flora Medica,' p. 52. The root is said to yield a juice which, according to the testimony of the natives of the country, is possessed of very valuable medical properties. M. Pacho, who travelled subsequently in the same country, thinks he has found the Laser, or Laserpitium, in Cyrenaica and Marmarica, and has called the plant *Laserpitium Derias*. (*Voyage dans la Cyrenaique*, Paris, 1827.)

There appear however to have been from the earliest times two kinds of Laser. Thus Pliny, 'Diu jam non aliud ad nos invehitur laser, quam quod in Perside aut Media et Armenia nascitur large, sed multo infra Cyrenaicum.' Dioscorides also states some to have been procured from Armenia and Media. Hence it is probable that some similar substance was substituted for the more highly esteemed Cyrenaican juice, when this became scarce. There can be very little doubt that assafœtida was at one time substituted for it, at least since the time of the Arabs, for Avicenna describes his *hulteet*, which is assafœtida, as of two kinds, one fœtid, and the other fragrant, the latter from the 'regio Chiruana' in the Latin translation; while *Anjudan*, which are the seeds of the assafœtida plant, are translated Laserpitium. That assafœtida was an article of export from Persia in very early times, we know, from seeing it noticed in the Sanscrit Amara Kosha, which is at least of as early a date as the commencement of the Christian æra. The juice and seeds of the assafœtida are likewise both used as medicinal substances, and the former esteemed even as a condiment by Asiatic natives. While the root of the Silphium, which grew on Paropamisus with pines, is mentioned by Arrian as affording food to numerous herds of cattle. This has been stated by Mr. Moorcroft to be the case, even in the present day, with another umbelliferous plant in the same regions, that is, *Prangos pabularia*, which is therefore conjectured by Dr. Royle to be one of the kinds of Silphium.

LASIOPY'GA. [PYGATHRIX.]

LASSO, ORLANDO DI (or Orlandus Lassus, a very distinguished name in musical history) was born in 1520, at Mons in Flanders, but, says Thuanus, was, on account of his fine voice, forced away, while a boy, by Ferdinand Gonzago, and detained by him in Sicily and in Italy. Afterwards, continues the same historian, being grown up, he taught during two years at Rome. He then travelled in France and England with Julius Cæsar Brancatius, and subsequently lived some years at Antwerp. On the invitation of Albert, duke of Bavaria, he next proceeded to Munich, where he married. But Charles IX. of France, who not only consented to but assisted in the massacre of the Huguenots, and whose conscience-pangs, like those of Saul, admitted of no alleviation, save that afforded by music, offered Orlando the high and lucrative situation of *maître-de-chapelle* at his court, which the composer accepted, and, with his family, was on his way to Paris, when the death of the king arrested his progress, and he returned to Munich, where he died in 1594, having long enjoyed so high a reputation, that a poet said of him—

'Hic ille Orlandus Lassus qui recreat orbem.'

His compositions are very numerous, and all show great knowledge of his art, much invention, and a manly determination not to be shackled by the rules and examples of the bigoted musicians of his time. 'He was the first great improver of figurate music,' Sir John Hawkins remarks; and Dr. Burney tells us that in his songs *alla Napolitana* 'the chromatic accidental semitones are expressed by a sharp, and no longer left to the mercy and sagacity of the singer, as was before the constant custom.' After his death, Rudolph, his eldest son, published a collection of his works, in seven volumes, under the title of *Magnum Opus musicum Orlandi de Lasso, complectens omnes cantiones quas Motetas vulgo vocant, a 2 ad 12 voc.*, &c.; and at Munich is preserved among the musical archives a precious manuscript of his compositions, ornamented with superb vignettes. In the British Museum is a Latin motet by Orlando; and specimens of his genius are given by Hawkins and Burney, in their histories of music.

LATAKIA. [SYRIA.]

LATAKOO, or LÆTAKOO, are two towns in the central part of Southern Africa, about 20 miles distant from each other. The south-western is called New Latakoo, or Kuruman. They are situated east of 24° E. long., and near 27° S. lat., nearly at an equal distance from the Atlantic and Indian Oceans, and not far from the line which separates the western deserts from the better-watered and more populous districts which extend eastward to the Indian Ocean. The latter seem to have a much more broken and hilly surface than the sandy districts on the west. These two towns, like some others in this part of the world, must be considered as the first attempts of the wandering nations inhabiting this country to form fixed settlements. In 1814 each of them contained a population of about 5000 souls, and consisted of low and dirty huts.

LATA'NIA, a genus of Palms of the tribe Borassineæ of Martius, which has been so called from the name *latanier*, of one of the species *L. borbonica*, indigenous in the Isle of Bourbon. The other species, *L. rubra*, a much smaller plant, and remarkable for its red-coloured leaves, is a native of the Isle of France. Both are moderate sized, with all the leaves of a palmate fan shape, the flowers yellow, and the drupes yellowish coloured. The leaves, like those of other palms, are employed by the natives for covering their huts, as well as for making fans and umbrellas. The leaf-stalks are split and employed for making baskets, sieves, &c. The fleshy part of the fruit is astringent, and the kernel bitter and purgative; and the sap is possessed of remarkable antiscorbutic properties, according to the statement of French authors.

LATERAN, the name of a church, Basilica Lateranensis, with a palace and other buildings annexed to it, situated at the south-eastern extremity of Rome, near the walls of Aurelian and Honorius, in the older and now desolate part of the city. This group of buildings is called 'in Laterano,' from being built on the estate once belonging to Plautius Lateranus, who was put to death by order of Nero (Tacitus, *Ann.*, xv. 60). It appears that the later emperors had a palace on the spot, and that Constantine had a church or chapel annexed to the palace. This was the beginning of the splendid church of St. John in Laterano. Constantine, or some of his successors, gave up the palace to the bishops of Rome, and the Lateran, till the beginning of the fourteenth century, was the residence of the popes, who enlarged the adjoining church at different times, and made it their episcopal or patriarchal church, which it continues to be. The pope, in his quality of bishop of Rome, goes to take solemn possession of it after his election, and he officiates there on certain great festivals, for which reason it is styled the head church in the world, 'Ecclesiarum Urbis et Orbis Mater et Caput.'

Many councils have been held in the palace of the Lateran, five of which are styled Œcumenic, or universal, at least for the Western church, and some of them were held in the most important periods in church history; two of them, concerning the quarrel with Henry IV. and V. of Germany, about the investitures, the council of 1179 against the Waldenses and Albigenses, and above all the Concilium Lateranense of 1215 held by Innocent III., which was attended by more than a thousand fathers, and in which the Albigenses were condemned and the dogma of transubstantiation was defined. The palace of the Lateran fell to ruin during the long residence of the popes at Avignon in

the fourteenth century, and a fire broke out in 1308, which consumed the greater part of it, as well as the church. The church was restored, but the palace was abandoned, and Gregory XI., when he transferred the papal see to Rome in 1377, fixed his residence in the Vatican palace, which then came to be considered as the residence of the pontiffs till the seventeenth century, when they went to reside on the Quirinal. Sixtus V. however in 1586 ordered a new palace to be built next to the Lateran church, which was not finished until more than a century after his death, and is that which now exists. It is used at present as an asylum for the poor; and there is also a large hospital on the other side of the square. The whole vast mass of buildings called by the name of Lateran has been much changed from what it was when the popes resided here. The old plan and former appearance of the place may be seen in the work of Rasponi, 'De Basilica et Patriarchio Lateranense,' libri iv., Rome, 1656. The interior of the Basilica, or church, in its present state, was completed in the seventeenth century by Clement VIII. and Innocent X., and the splendid front was raised by Clement XII. The church has five aisles, and is enriched with pillars of valuable and rare marble, statues, paintings, gildings, and bronzes. The middle gate, which is of bronze, and of masterly workmanship, was taken from the Æmilian Basilica in the Forum. The statue of Constantine, under the portico, was found in the Thermæ of that emperor on the Quirinal Mount. The ceiling of the centre aisle, which is carved and gilt, is one of the richest in Europe. The bronze mausoleum of Martin V. is in the central aisle. Among the side chapels that belonging to the Corsini family is one of the richest in Rome; the pillars, walls, and pavement are of valuable stones, and the mausoleum of Clement XII. (Corsini) consists of a beautiful urn of porphyry, which lay under the portico of the Pantheon. The altar of the sacrament is adorned with four fluted columns of gilt bronze, which, it is said, came from the temple of Jupiter Capitolinus. The cloisters, which date from the thirteenth century, have some curious monuments of the middle ages. In every respect the church of the Lateran is one of the most interesting in a city abounding with magnificent churches.

The obelisk of Syene granite which stands in the square at the back of the church is the highest in Rome, and perhaps in the world: its shaft, which is broken into three pieces, is 105 feet 7 inches English in height, and 37 feet 6 inches in circumference at the base; the whole height of the obelisk, pedestal and ornaments included, is about 150 feet. This obelisk was brought by Constantine from Heliopolis to Alexandria, and Constantius had it removed to Rome in a galley built for the purpose, rowed by 300 men: after ascending the Tiber the obelisk was conveyed on rollers through the gate of Ostia and the Piscina Publica into the Circus Maximus, and was raised by a very laborious process which is described by Ammianus Marcellinus. The obelisk is covered from the base to the very pointed top with exquisite sculptures, and is supposed by some to contain the inscription which was translated into Greek by Hermapion, and which records the victories of Rhamses, but Champollion says that the Lateran obelisk was raised in honour of Thouthmosis II.

The Baptistery of Constantine, which adjoins the church, is rich in marble pillars and paintings, and it contains the oldest baptismal fount which was used in Rome.

The church of St. John in Laterano is collegiate: its chapter of canons and prebendaries, instituted by Boniface VIII. in 1300, has at its head a Cardinal Archpriest.

Near this church is a detached building called La Scala Santa, because the staircase in it is said to contain a number of steps from the house of Pilate, which Jesus Christ ascended, and which are held in great veneration. Pious people ascend them on their knees, and to prevent the steps from being worn out, they have been covered with boards.

The gate of San Giovanni, through which passes the high road to Naples, is the antient Porta Asinaria, and the first object that strikes the traveller on entering Rome by it is the handsome Basilica of the Lateran, with its adjoining palace and other buildings rising on the slope of the Cœlian Hill, and rendered more imposing in their appearance from standing insulated in the midst of solitary fields and gardens which occupy all this side of the area of Rome.

LATHE. [KENT.]

LATHE. [TURNING.]

LATHRIA. [MUSCICAPIDÆ.]

LATIMER, HUGH, bishop of Worcester, the son of a farmer in Leicestershire, was born about the year 1472. He was educated first at a grammar-school, and afterwards at Cambridge, where he took a degree, previous to entering into holy orders. The preaching of Bilney directed his attention to errors in the doctrines and discipline of the church of Rome; the subject soon engrossed his mind, and his 'heretical preaching,' as it was then called, caused a remonstrance to be made by the divines of Cambridge to the diocesan bishop of Ely, and his interference was requested. The bishop, a mild and moderate man, visited Cambridge, but used no further harshness towards him than to forbid his preaching within the diocese, an obstacle which he overcame by gaining the use of a pulpit in a monastery exempt from episcopal jurisdiction. Latimer's eloquence, his moral conduct and kindness of disposition, together with the merits of his cause, gained him a large number of hearers. He was at this time a person of sufficient importance to be esteemed worthy of persecution, and was dealt with accordingly, but it was not until Henry VIII. had been thirty years upon the throne, that he became distinguished as one of the principal reformers.

Cromwell, the king's favourite, had already given him a benefice in Wiltshire, where he had preached the Reformed doctrines with such plainness as to cause the bishops to cite him to London to answer for his heretical opinions. Cromwell continued afterwards to be his friend and patron: he rescued him from the perils of the citation, recommended him to Anne Boleyn, who appointed him her chaplain, and soon afterwards the bishopric of Worcester was conferred on him (1535). The duties of this see he performed in the most active and exemplary manner, and while holding visitations, giving instructions, and correcting abuses, never failed to promote the Reformation to the utmost of his power. Thus did he employ himself for three years, at the expiration of which passed the act of the Six Articles (Burnet, vol. i.), from which he so totally dissented, that he resigned his bishopric. Shaxton, bishop of Winchester, followed his example, but Cranmer retained his office.

Latimer now sought retirement in the country, where he would have continued to reside, had not an accident befallen him, the effects of which he thought the skill of London surgeons would alleviate. He arrived in London when the power of Cromwell was nearly at an end, and the mastery in the hands of Gardiner, who no sooner discovered him in his privacy, than he procured accusations to be made against him for his objections to the Six Articles, and he was committed to the Tower. Different causes being alleged against him, he remained a prisoner for six years; and not until the accession of Edward VI. did he obtain his liberation. The parliament then offered to restore him to his see, but he was obstinate in his refusal to receive it: his great age, he said, made him desirous of privacy. In this reign we find him the accuser of Bonner, occasionally the adviser of the king, and continually the strenuous reprover of the vices of the age; but the reign was short, and with it expired Latimer's prosperity. In July, 1553, king Edward died; in September Mary had begun to take vengeance on the Reformers, and among others Latimer was committed to the Tower. Though he was at least eighty years old, no consideration was shown for his great age; and he was sent to Oxford to dispute on the corporal presence. He had never been accounted very learned: he had not used Latin much, he told them, these twenty years, and was not able to dispute; but he would declare his faith, and then they might do as they pleased. He declared, that he thought the presence of Christ in the sacrament to be only spiritual: 'he enlarged much against the sacrifice of the mass; and lamented that they had changed the communion into a private mass; that they had taken the cup away from the people; and, instead of service in a known tongue, were bringing the nation to a worship that they did not understand.' (Burnet, vol. ii.) They laughed at him, and told him to answer their arguments; he reminded them that he was old, and that his memory had failed; the laughter however continued, and there was great disorder, perpetual shoutings, tauntings, and reproaches. When he was asked whether he would abjure his principles, he only answered, 'I thank God most heartily that he hath prolonged my life to this end, that I may in this case glorify God with this kind of death.' On the 16th of October, 1555, he was led to the stake with Ridley, gunpowder being fastened about his body to hasten his death; it took fire with the first

flame, and he died immediately. Latimer published several of his sermons at different times. They have been reprinted in 2 vols. 8vo., London, 1825.

Latimer was remarkable for moral excellence and simplicity rather than for learning, and for zeal rather than for ability: he was a good but not a great man. (Burnet's *Reformation;* Le Bas's *Life of Cranmer;* Moreri, *Dic. Historique; Biog. Dic.*)

LATI'NI was the name of one of the oldest known nations of Italy, who are said to have come down at some remote time, long before the building of Rome, from the central Apennines in the neighbourhood of Reate (the modern Rieti), into the lower country between the Anio, the Tiber, the Alban Mountains, and the sea, which was afterwards called Latium. Varro, who derived his information from the old traditions existing at Rome in his time, says that they were a branch of the aborigines or oldest inhabitants of the peninsula, who were considered by some as indigenæ or autochthones of the country, whilst others, and Dionysius among the rest, thought that they were descendants of an Arcadian colony settled in Italy long before the Trojan war, and identical with the Œnotrians. These aborigines met in the lowlands the Siculi, who are represented by some as a colony from the West, perhaps from Spain, and by others as indigenous in Italy, and identical with the Tyrrheni. These Siculi, or Siceli, were partly driven by the aborigines to the southwards, and the rest amalgamated with the new comers, and thus the nation was formed called afterwards Latini Prisci, and by Ennius called Casci, which in the Sabine or Oscan language, according to Varro, meant old, or the earliest, and the word is still used, as Micali observes, in the dialects of the Papal provinces of Sabina and Umbria in the same sense. These Latins appear to have formed their settlements in the lowlands by small communities, perhaps small tribes or even families, a circumstance which would account for the great number of villages or towns spread over a limited surface. Several of these became in course of time considerable places, long before the existence of Rome. Such were Laurentum, Lanuvium, Lavinium, Aricia, Gabii, Tusculum, Tibur, Præneste, Labicum, Collatia, Cora, &c. [LATIUM.] The story of Æneas landing at the mouth of the Tiber, assisting the Latins against the Rutuli, and marrying Lavinia, the daughter of King Latinus, is probably an embellishment invented in aftertimes by Roman pride or Greek flattery. [ÆNEAS.] Some of the earlier Greek writers said that Rome was a Greek colony. (Niebuhr, *History of Rome*, vol. i., 'The Preliminary History of Rome.') Parties of Greek or Trojan emigrants may have landed on the coast of Latium at various times, and given rise to these various stories. That there was a strong mixture of Grecian blood in the Latin race seems not to be doubted, and a comparison of the elementary parts of the Greek and Latin languages proves at least that those who used these tongues were sprung from or related to a common stock. [LANGUAGE.] The Latin communities were united by religious rites. Cato in his 'Origines' says that the temple of Diana in a grove near Aricia was resorted to for their common sacrifices by the Aricini, the Tusculani, the people of Lanuvium, of Laurentum, of Cora, and also by the Rutuli, a people at one time distinct from the early Latins, and inhabiting a nook of land near the sea-coast, between the Latins and the Volsci, and whose capital was Ardea. The Numicius was the boundary between the Rutuli and the Latins of Laurentum. The Rutuli are mentioned as a wealthy people in the third century of Rome, in the time of Tarquinius Superbus (Livy, i. 57); their wealth was probably the fruit of their maritime trade. Ardea is said to have sent a colony to Saguntum in Spain. The Rutuli however appear also as forming part of the Latin Confederation, and there was a temple dedicated to Venus between Lavinium and Ardea which was under the care of the Ardeates, and whither all the Latin communities sent deputies on particular occasions. At other times the deputies of the Latin towns assembled at the Lucus Ferentinæ, where the wood of Marino now is. (Livy, i., 50; vii., 25.) The indigenous deities of the Latins were Saturnus, who first taught agriculture to their ancestors the aborigines, Janus, and Faunus, who delivered his oracular answers from the depth of the forest of Albunea. Venus and others appear to have been of later introduction into the Latin mythology.

The Latini are described as a race robust, hardy, frugal, and warlike, and their early union with Rome, great part of whose population was recruited amongst them, contributed mainly to the growth and success of that republic. Their morals were simple; it is recorded by Athenæus and A. Gellius, on the testimony of earlier writers, that their women did not drink wine, and the custom of being saluted on the cheek by their relatives is said to have been introduced in order to ascertain their abstemiousness. Their towns were strong, both by their position and their massive walls, traces of which still exist on the sites of antient Præneste, Tusculum, and other places of dates anterior to Rome, and are ascribed by some to the Tyrrhenians, who preceded the Latini, and have been confounded with the Pelasgians. The foundation of Alba is involved in great obscurity, but the fact of its being an important town several centuries before the existence of Rome is indubitable. [ALBA LONGA.] Whether Alba was at the head of the Latin Confederation, or was the centre of another confederation distinct from that of the Latins though connected with it, has been a matter of doubt. Niebuhr adopts the latter supposition. A distinction is made by Livy between the Albans and Latins. The dictator of Alba is not called the dictator of the Latins. The founders of Alba were either emigrants from Lavinium, who built a town and set up an independent state for themselves, according to Livy's story of Ascanius, or they were strangers, probably a tribe from the mountains, who built a new town, which in course of time ruled over part of Latium and sent colonies to Lavinium and other places on the coast which had become deserted. Alba is said to have ruled over thirty colonies, and a like number of thirty towns is mentioned as constituting the Latin confederation in the Roman period.

Passing over the obscure period between the building of Alba and that of Rome, we find the Latins coming into contact with the latter city, which, although built on Latin ground, and itself a colony of Alba, paid no great deference to its mother-country or elder neighbours. Rome, according to tradition, was a city of refuge, and its population a medley of various races, who did not acknowledge any ties with or duties towards others. Their first quarrel was with the Sabines, with whom afterwards they made an alliance; next with the Etruscan townships bordering on the Tiber, and the turn of the Latins came later. We find Rome in alliance with Lavinium, notwithstanding the murder of Tatius, the Sabine king, and the ally and partner of Romulus, which had occurred there out of private revenge.

Under Tullus Hostilius war broke out between Rome and Alba, which ended in the destruction of Alba and the removal of the inhabitants to Rome. The other Latin cities appear to have taken no part in the war, but on the contrary entered into an alliance with Rome. (Livy, i. 32.) In the following reign of Ancus Marcius, the first war of the Latins against Rome is mentioned: the result was that Politorium, Tellenæ, and Ficana were taken by the Romans, and the inhabitants transferred to Rome, where they were settled on Mount Aventine. Tarquinius the elder, the successor of Ancus, attacked the Latin towns separately, and took Appiola, Corniculum, Cameria, Ficulnea vetus, Crustumerium, Ameriola, Medullia, and Nomentum, after which peace was made, but it is not said on what conditions. Servius Tullius obtained, by agreement with the leaders of the Latin cities, what his predecessors could not obtain by force, namely, that the Latins should unite with the Romans in building a temple to Diana on the Aventine, to be common to both people. This was considered as an acknowledgement that Rome was the head of the Latin nation. The Sabines were also included in the compact, and the temple was declared to be an inviolable asylum for individuals of the three nations. It was likewise agreed that, after the annual sacrifices, conferences should be held between the deputies of the various nations, and matters in dispute should be settled in a friendly manner. This wise measure greatly contributed to consolidate the strength of Rome. It was in consequence of this arrangement that Tarquinius Superbus, who was anxious to secure to himself a party among the leaders of the Latin towns, and had given his daughter in marriage to Mamilius, one of their chiefs, convoked them to an assembly in the wood of Ferentina, where he got rid by an atrocious stratagem of Turnus Herdonius of Aricia, who is represented as the leader of the opposition among the Latins. (Livy, i., 50, 51.) Tarquin then persuaded the Latins not only to renew the treaty with Rome, but to acknowledge him as their princeps, or chief, and to send their youth to serve no longer as auxiliaries, but

mixed with the Romans in the same legion. He united a century of Latins and a century of Romans in every maniple commanded by a Roman centurion. All this, together with his treatment of Gabii, shows that Tarquin had succeeded in making himself real master of Latium. Tarquin also assumed the presidency of the Feriæ Latinæ, or festivals of the Latin state, which by an antient usage were held once a year on the summit of the Alban Mount, and were dedicated to Jupiter Latiaris or Latialis; and he made these solemnities common to the Romans, the Latini, and the Hernici. Deputies from the three nations and from other allied districts attended, each bringing their victims. The sacrifices lasted three days, some say six, after which a 'visceratio,' or distribution of meat, took place among the deputies. These feriæ continued, bating some temporary interruptions, to be held down to the latest period of the Roman republic, and one of the two consuls always attended them. (Cicero, *De Nat. Deor.*, i., 6; *Ep. ad Fam.*, viii., 6; *Divinat.*, i., 11.)

After the expulsion of the Tarquins, the Latin cities, partly to free themselves from Roman supremacy, and partly instigated by Mamilius, Tarquin's son-in-law, and the other connexions of the Tarquins, rose in arms, and a war ensued between them and Rome, which ended in the total defeat of the Latin forces by the Roman dictator Posthumius, near the lake Regillus, between Labicum and Gabii, B.C. 499. Peace was made three years after, on condition that the Latins should expel the refugee partisans of the Tarquins. These lenient conditions were probably agreed to by Rome, from apprehension of the approaching struggle with the Volsci. A few years later, under the consulship of Spurius Cassius and Postumus Cominius, a solemn 'fœdus,' or treaty of alliance, was made between Rome and the Latins, by which was renewed the isopolitan franchise formerly existing in the time of Servius in each of the two nations with respect to the other, as being on a footing of perfect equality, though probably with no interchange of the respective political franchise. This treaty is known in the Roman writers by the name of the Cassian League, Cassianum fœdus: the conditions were engraved on a brass column mentioned by Livy, and the substance of them is given as follows by Dionysius, who took them from Macer, who had seen the inscription:—'There shall be peace between the Romans and the Latins so long as heaven and earth shall keep their place; neither state shall war against the other, nor instigate foreign states to do so, nor grant a passage through its territory to foreign armies against its ally; but when either suffers damage or vexation, the other shall loyally render it protection, help, and succour. The booty and everything gained in a joint war shall be shared equally. Private suits shall be decided within ten days in the place where the cause of litigation arose. No article shall be erased from this treaty nor added to it, except by the common consent of the Romans and of the commonwealth of Latium.' Thus far Dionysius, but it appears also from other authorities that the Latins shared with the Romans, or held by turns, the command of the combined forces of the two states. (Niebuhr, vol ii., 'The League with the Latins.') Seven years after this league Spurius Cassius concluded a treaty with the Hernici on similar terms; and it is remarkable that in some cases, as at Antium, colonies were sent consisting of equal portions of the three nations.

The league of the Latins with Rome lasted for about a century, till the irruption of the Gauls, during which period there were but few occasional interruptions of the harmony between the two states. To one of these Rome had given a strong provocation. The people of Ardea and those of Aricia having referred to the arbitration of the people of Rome their dispute concerning a territory to which both laid claim, the cause was pleaded before the Roman tribes; and just as the votes were going to be collected, an old man, eighty-three years of age, called Scaptius, rose, and said that he remembered, when serving in a former war, to have noticed the territory in question as belonging to the town of Corioli, which was taken by the Romans, and that therefore the land had become Roman property. Upon this the tribes decided the question against both parties, saying that the territory belonged to the Roman people. In vain the consuls appealed to their honour and equity not to act as judges in their own cause. The land was taken possession of. The consequence was that Ardea offered to join the league of the Volsci and Æqui against Rome, but was deterred from so doing by receiving from the Roman senate hopes of redress. Soon after a dispute broke out at Ardea between the patricians and plebeians of that place, on account of a young woman who had two suitors, one of each class; and this led to a civil war. The patrician party proved the stronger within the town, and drove out the plebeians, who, being joined by a party of the Volsci, after plundering the lands of the patricians, laid siege to the town. The patricians applied to the Roman senate for assistance. The consul M. Geganius Macerinus, being sent to their assistance, B.C. 443, defeated the besiegers, and took Cluilius, the Volscian commander, prisoner. But these disturbances thinned Ardea of her inhabitants, and the senate took this opportunity of sending thither a colony to strengthen the place against any future attempts of the Volsci; and at the same time directed the triumviri, who had the conduct of the colony, to divide the principal part of the disputed territory above-mentioned among the original inhabitants of Ardea. The triumviri, after fulfilling their mission, settled at Ardea as colonists, in order to evade the annoyances which they would have met on their return from the tribunes of the people for having divided among the Ardeates a territory which the people of Rome had formerly adjudged to themselves. (Livy, iii., 71 and 72; and iv., 9, 10, and 11.) Not long after this the people of Labicum, a Latin city, having joined the Æqui, who were at war with the Romans, and plundered the city of Tusculum, another Latin city, friendly to Rome, the Romans attacked, defeated them, and took their town. But these were but partial and temporary ruptures. The bulk of the Latins appear to have remained faithful to the Cassian alliance. The Latin state consisted of thirty towns, which appear to have been independent municipalities; they had their patricians and plebeians; each had its senate and its own magistrates, the chief of whom was styled dictator. Deputies from each town constituted the senate or assembly of the whole state, which met at the grove of Ferentina. A dictator, probably taken by turn from the dictators of the respective cities, was the temporary head of the whole state, presided at the Latin festivals on the Alban Mount, and signed treaties, such as that of alliance with the consul Spurius Cassius. Concerning the constitution and laws of the Latin people previous to their final union with Rome, Sigonius (*De Jure antiquo Italiæ*) and Niebuhr (*History of Rome*, vol. ii., 'The Latin State') have endeavoured to collect all that can be gleaned from scattered passages of the antient writers.

After the invasion of the Gauls and their retreat from Rome, we find both the Latins and the Hernici, at least in part, joining the Volsci, Æqui, and the Etruscans, the old enemies of the Romans, and endeavouring to annihilate the city, which was just rising from its ruins. Camillus defeated the Latin towns one after the other. Tusculum having humbled itself, and sent a deputation, headed by its dictator, to the Roman senate to deprecate its wrath, was forgiven, and shortly after obtained the 'civitas,' or Roman citizenship, which enabled its inhabitants to have a domicile at Rome, to vote in the Roman comitia, and to aspire to the public offices of the Roman republic. The Prænestini were defeated, and their town surrendered by capitulation to the dictator Titus Quintius, who brought from it to Rome the statue of Jupiter Imperator, which was placed in the capitol. Soon after, B.C. 376, we find the Latins, after again joining the Volsci, encamped with them near Satricum, a Volscian town on the borders of the Latini. Being defeated after an obstinate engagement by the Roman military tribunes Æmilius and Valerius, the Volsci forsook their allies, and the people of Antium submitted to the Romans, upon which the Latins in a fit of rage burnt Satricum, sparing only the temple of Matuta, an antient deity of the country. From Satricum they turned against their Tusculan countrymen for having accepted the Roman citizenship; they entered Tusculum by force; but the inhabitants took refuge in the citadel, and the Romans under L. Quintius and Servius Sulpicius coming to their assistance, the Latins were surrounded and slaughtered. After a war with Tibur, which led to no definite result, peace was granted, B.C. 357, to the Latins on their demand, and they consequently furnished again a large auxiliary force to Rome, agreeably to former treaties, after an interruption of many years, which assistance, as Livy (vii. 12) acknowledges, came very acceptably at a time when the Romans were engaged in war

with the Etruscans and the Hernici; besides being threatened by the Gauls, who still hovered about the country. When however, some years after, the Gauls, though repeatedly defeated, appeared again in force and overran the plains of Latium, the coasts of which were at the same time infested by Greek pirates, the Latin towns, in a meeting which they held at the wood of Ferentina, sharply replied to the Romans, who insisted upon their speedily furnishing their contingents, 'that the Romans ought not to talk so imperiously to those whose assistance was to them of vital importance; that the Latins would fight rather for their own liberties than for the purpose of extending the dominion of others.' (vii. 25.) Soon after that time, the Carthaginians are mentioned by Livy as having entered into a treaty with Rome; but Polybius gives us the text of a former treaty, said to have been concluded between the two republics in the first year after the expulsion of the Tarquins, in which Ardea, Antium, Aricia, Circeii, and Terracina are mentioned as towns subject to Rome, and included within the protection of the treaty; but another part of Latium is mentioned as not subject to Rome, on which the Carthaginians might land, and carry off the booty and prisoners, but not build forts, or make any permanent settlement. This treaty, if really of the time of the Tarquins, which is doubted, would confirm the notion that the Roman power under the last kings was much greater than is commonly supposed, a notion which is supported by Niebuhr. See also Heyne's dissertation on the treaties between Rome and Carthage, in the *Götting. Anzeigen.*

The first Samnite war, which broke out B.C. 342, in consequence of the people of Capua applying to Rome for protection against their stronger and fiercer neighbours, and placing themselves and their country under the Roman dominion, having ended with a peace two years after, the Samnites turned their armies against the Sidicini, who inhabited the country between the Liris and the Vulturnus. The Sidicini sought assistance from the Latins, under whose protection they placed themselves. The Latins, joined by the Campanians, who took an unfair advantage of the Roman protection to satisfy their old grudge against the Samnites, entered their territory and ravaged it. The Samnites appealed to the Roman senate, requesting them to restrain the Latins and Campanians, if they were both dependents of Rome; if not, the Samnites claimed to be allowed to oppose force to force. The answer of the senate was cautious: 'The Campanians had given themselves up to Rome, and therefore Rome would oblige them to keep quiet; but as for the Latins, there was nothing in their stipulations with Rome that forbade them making war with whomsoever they pleased.' This answer increased the audacity of the Latins, and in their frequent councils they began to plan together with the Volsci and Campanians a new war against Rome. Even the Roman colonies of Circeii, Velitræ, and others, joined the Latin league. This having come to the knowledge of the Romans, the senate requested that ten of the chief men among the Latins, 'principes Latinorum,' should come to Rome to explain matters. Among them was one L. Annius of Setia, who was that year one of the two prætors, or chief magistrates, of the whole Latin confederation. When in the presence of the Roman senate, after boasting of the power of the Latins and their allies, and of their being fully able to assert their own independence, he proposed that, for the sake of former connexion and consanguinity between them and the Romans, peace should be concluded upon a solid and equitable foundation. With a view to this he required 'that the Latins should have the appointment of one of the two consuls, and of one half of the senate, so that Rome and Latium should form in future but one country and one republic, of which Rome would be the capital, and all the people be called Romans.' This apparently not unreasonable proposal offended Roman pride, and the consul T. Manlius Torquatus, a man of more than Roman sternness and inflexibility, exclaiming against the insolence of a man of Setia, swore that if the Patres Conscripti should be so insane as to accept his proposal, he would himself come armed into the senate and kill any Latin he should meet there. The senate declared war against the Latins, and the two consuls, Manlius Torquatus and Decius Mus, marched each with an army, through the territory of the Marsi and Peligni (the modern Abruzzo Ultra), and being joined on their march by the Samnites, encamped near Capua, in front of the Latin and Campanian united forces. Here Manlius gave a dreadful instance of Roman severity, in causing his own son to be beheaded for having engaged in a skirmish with the enemy contrary to his orders.

The decisive battle took place in the plain near the base of Vesuvius, and it was one of the hardest fights in which the Romans had ever engaged, for, as Livy observes, in giving a description of the order of battle (viii. 8), the Latins were in every respect so much like the Romans, and fought so much like them, that it more resembled a contest among countrymen and relatives than a fight between strangers. The 'hastati,' or first line, of the Roman left wing, commanded by Decius, began to give way before the charge of the Latins, and fell back upon the second line, or 'principes,' when, at this critical moment, Decius, devoting his life to the Dii Manes for the safety of his country, and mounting his horse, rushed into the midst of the Latin ranks, broke through their first line, and at last fell covered with wounds. The Latins, though somewhat confounded by this desperate onset, continued to fight bravely, and pushed forward their triarii, or third line, whilst the consul Manlius kept back his third line, kneeling and concealed in the rear, as a last reserve. When he saw the whole Latin force engaged and already breaking through his line, he ordered his reserve to attack the enemy. This decided the victory; the Roman triarii were fresh; the Latins, being weary and taken by surprise at the moment when they made sure of victory, gave way, their ranks were broken, and hardly one-fourth part escaped to Minturnæ. After sustaining a subsequent defeat at Trifanum, the Latins made their submission, when part of their land was taken from them and appropriated to the Roman people. The people of Laurentum however, who had taken no part in the war, were excepted from the confiscation, and their fœdus, or treaty of alliance, with Rome was renewed. In the following year however several of the Latin cities rose again; but instead of uniting their armies in the field, they kept their men within their respective walls ready to sally out; and whenever the Romans attempted the siege of one, all the rest lent assistance to the besieged. The strength of the Latins was in their numerous fortified towns, inhabited by a warlike people, though inferior to the Romans in discipline, training, and moral perseverance. The Romans laid siege to Pedum; but the inhabitants of Præneste, Tibur, Velitræ, and others, came immediately to its assistance, and the consul Æmilius raised the siege. Latium, as Livy observes, was in a state that was neither peace nor war. In the next year (B.C. 337) the consul L. Furius Camillus, grandson of the deliverer of Rome, took the field: he entered Pedum by storm, and, together with his colleague, reduced successively the other Latin towns, and placed garrisons in them. On his return to Rome he made his report to the senate: he told them that it was in their power to destroy the Latin towns, and make a vast solitude of that fine country from which they had derived the best part of their strength in former wars; but he advised them to attach the people to themselves for ever by giving them the Roman citizenship, and thus to strengthen the sinews of the republic. The senators, adopting mercy as the wisest course, made however a distinction according to the conduct and merits of the various Latin cities. Lanuvium and Nomentum received the Roman citizenship; Tusculum was confirmed in the possession of it; Aricia was kept for a time as a subject town, but was afterwards admitted to the franchise; Tibur and Præneste had their lands confiscated, not so much for the late revolts as for their former association with the Gauls, a barbarous and ferocious people. Velitræ, as being an old Roman colony, was more severely treated: its walls were razed, and its senators banished beyond the Tiber, under severe penalties if any of them should be found on the left or Roman bank of the river. Their lands were given to colonists. A fresh colony was sent to Antium, and the old inhabitants were allowed to inscribe themselves as colonists; but their ships were taken from them, and they were forbidden to go any more to sea. The other Latin townships, according to Livy (viii. 14), were deprived of the rights of connubium and commercium, which they had enjoyed by the fœdus or treaty made under Spurius Cassius and Postumus Cominius. The general assemblies of the Latin cities at the wood of Ferentina were of course at an end. Thus terminated the existence of the Latins as an independent people: they became subjects of Rome, excepting the few towns above mentioned which had the

Roman citizenship, wholly or in part, with or without the suffragium, or vote; for this is not always stated by the historian. The Latins, after that epoch, are no longer mentioned as socii, but distinguished from the genuine Romans as being 'Latini nominis.' It would appear however from some passages of Cicero, that in course of time the Latin townships in general were allowed to resume most of the rights which had belonged to them by the Cassian treaty, and that they continued to elect their own municipal magistrates. (Sigonius, *De Jure antiquo Italiæ*, b. i., 'De Jure Latii.')

During the second Punic war Hannibal tried to work upon the feeling of dissatisfaction which he knew must exist in the breasts of many of the Latins, as well as other nations of Italy which had been conquered by Rome; and accordingly, after the battles of Trebia and Thrasymene, he separated the Latin and Campanian from the Roman prisoners, and released the former without ransom. The Latins however, unlike the Campanians, Samnites, Hirpini, Lucanians, and others, who went over to Hannibal, remained faithful to Rome, whose armies were repeatedly recruited among them during that long and fearful contest. This loyalty of the Latins, and the policy of confirming them in it, seem to have made an impression on the minds of some of the Romans, as we find it proposed in the Senate in the fifth year of the war to select two senators out of each Latin town to fill up in the Roman Senate the place of those who had fallen in battle. But most of the fathers, and especially L. Manlius, a descendant of Torquatus, who had fiercely opposed a former proposal of a similar nature, exclaimed against what they considered as an indignity; and Fabius Maximus put an end to the question by declaring that it was the most dangerous cord that could be touched at that time, when the faith of the allies of Rome stood upon so precarious a tenure, and that the very recollection of such a subject having been agitated in the Senate ought to be obliterated and buried in secresy in the bosom of each senator.

The Latins remained for two centuries and a half in the same dependent condition, without the rights of citizenship ('sine civitatis jure'), until the breaking out of the Social or Italian war. The tribune Livius Drusus proposed that the full Roman citizenship should be extended to them, as well as to the other nations of Italy, which had formed treaties of alliance with Rome. Drusus however was murdered, and his motion was dropped for a time. But when the Marsi, Samnites, Peligni, Campanians, and Lucanians rose in arms, and constituted themselves into a confederation, of which they made Corfinium the capital, and after they had defeated several Roman armies, the consul L. J. Cæsar (B.C. 91) advised and obtained the passing of a law which gave the Roman franchise to all the people of Italy who were allies of Rome and had remained faithful in that emergency. This franchise, or civitas, is stated accordingly to have been granted to the 'socii,' or allies, who had furnished their contingents, and to the Latins, who are mentioned distinctly from the rest. By this grant, the freemen of the Latin towns were placed so far on a level with the Roman citizens, as to enjoy the full Roman franchise, to be admitted into the Roman rustic tribes, have votes, and be eligible to public offices. Thus the distinction between the Romans and the real or original Latins was obliterated, but another class of nominal Latins sprung up in the following year, in the consulship of C. Pompeius Strabo, when the Latinitas, or right of Latin colonies, was granted to the towns of Transpadane Gaul. This leads us to speak of the Jus Latii, or 'Jus Latinum,' as distinguished from the Civitas, or Jus Civium Romanorum.

LATI'NUM JUS, JUS LA'TII, LATI'NITAS, sometimes also called simply **LATIUM**, was one of the various civil conditions under which the inhabitants of the Roman world were classed and comprised. The primary distinction of persons was that of freemen and slaves. A slave had no rights whatever; he was merely 'res,' a thing, the property of his master, the same as his cattle. Freemen were divided, according to the Roman polity, into 1. Cives Romani; 2. Latini; 3. Peregrini, or aliens. The Roman citizen lived under the civil law of Rome, which determined his rights and duties, and he might aspire to the offices and honours of the Roman state.

The second civil condition in the Roman state was that of 'Latini,' or those whose rights and duties were defined by the 'Jus Latinum.' They formed a considerable and important class, and ranked next to the Roman citizens in privilege. This class however was differently formed, and enjoyed different rights at various periods of the history of Rome.

The old inhabitants of Latium, whilst they continued fœderati or confederates of Rome under the Cassian treaty, enjoyed several of the rights of Roman citizens. The rights of a Roman citizen were of two sorts, private, or civil, and public, or political. The principal private rights were the 'jus libertatis,' or personal freedom, by which the Roman citizen was master of his own person, could not be arbitrarily imprisoned nor punished, except after legal trial, and could not be scourged on any account; the 'jus connubiorum,' by which he was enabled to contract a legal marriage with a Roman freewoman, or with those Latinæ or Peregrinæ who enjoyed the privilege of the connubium, and by which his children were also Roman citizens; the jus patrium, the consequence of the connubium, which gave him that unbounded authority over his children which was peculiar to the Roman law, and which no other people were possessed of (Gaius, i. 55; Justinian, *Institutiones*, i. 9); the jus legitimi dominii, which included the ability of acquiring property, by testamentary gift, mancipatio or nexum, usucapion, cessio, &c.; and the jus testamentorum, by which he was enabled to bequeath property by will.

The chief public or political rights were, the jus census, or having his name registered in one of the tribes and centuriæ; the jus suffragiorum, or right of voting in the comitia; the right of appeal to the comitia from the sentence of the magistrate; and the jus honorum, by which he was enabled to aspire to any of the dignities in the state. Now the freemen of the Latin confederate towns lived under their own laws, and therefore were not under the civil law of Rome; they had their own forms of marriage, of testaments, &c., which were valid in their own courts, but not at Rome; they had not the same paternal authority as the Romans over their offspring: they could not purchase, possess, or inherit property at Rome or in the Roman territory; their persons were not under the protection of the Roman law; they might be sent away from Rome, and they and the other Italian socii were sent away repeatedly, among other instances, under the consulship of Lucius Crassus and Mutius Scævola, in the year B.C. 96, just before the beginning of the Social war, to which that expulsion greatly contributed. It would seem however that all the towns of Latium were not on the same footing in these respects, and that some of them had adopted of their own choice certain Roman laws, and by so doing had become, according to the Roman legal term, 'populi fundi,' that is to say, had entered within the pale of those particular Roman laws, and had the benefit of their provisions even at Rome. (Cicero, *Pro Balbo*, viii.) Whether the Latin confederates had the connubium, or right of intermarriage, has been questioned by some; Niebuhr however (vol. ii., 'On the Franchise of the Latins') maintains that they had.* As for the public or political rights of Rome which mainly constituted what was called the 'civitas,' the Latins were not 'censi' at Rome, and they could not aspire to the honours and offices of the Roman state, except those who had previously filled certain municipal offices in their own town for a time, after which, by transferring their domicile to Rome and inscribing their names in one of the tribes, they acquired the civitas and all its rights and privileges. It appears also that there were other means by which a Latin or other Italian freeman might obtain the Roman civitas, by rendering some important service to the Roman state. With regard to the right of suffrage, it is not clear under what conditions the municipes of the Latin cities enjoyed it, but it appears that they came at times to vote at Rome on cer-

* Notwithstanding all that has been written on the subject, it is not so easy to say precisely what the connubium was. The only intelligible definition is that of Gaius (i. 56), who, when speaking of the marriage of a Roman citizen with a Roman woman or with a Latina or Peregrina with whom the connubium existed, observes that the effect of the connubium was that the children followed the condition of the father, were consequently Roman citizens and subject to the patria potestas. That the like consequence followed if a Latin married a Roman woman, as to the rights of such children as Latin citizens, is merely the corresponding and correlative part of the connubium. But that the connubium alone enabled a Latin citizen who married a Roman woman to confer on his children the rights of Roman citizens, and himself to acquire the patria potestas, seems inconsistent with the notions of Roman citizenship. The subject of the Jus Latii, and of the connubium in connection with it, is very difficult to understand, and the obscurity is by no means diminished by the way in which Niebuhr has handled it.

tain occasions, but then they had no fixed tribe, and voted in a tribe which was drawn by lot, and they might, as it has been said already, be ordered away by the magistrates previous to the day of voting, as was done by the consul Virginius, the colleague of Spurius Cassius. In the year B C. 123, they came to Rome to vote in favour of the laws proposed by Caius Gracchus, but the consul C. Fannius ordered them away immediately. The civil condition of the Latins, or Jus Latinum, was therefore inferior to that of the Romans, but next to it in importance, and a kind of intermediate step towards obtaining it. They had, even at Rome, some advantages over the Peregrini, or aliens, who were domiciled in that city.

When the Romans began sending out colonies to several towns of Latium, such as Ardea, they probably placed the colonists on the same footing as the old Latin inhabitants, namely, under the Jus Latinum. And afterwards they followed the same system with regard to colonies which they sent to other parts of Italy, and which were called Latin colonies, though this name did not mean that they consisted of Latins, but that the colonists, whether Romans or Latins or from other parts of Italy, were placed, with regard to Rome, on the same footing as the inhabitants of Latium. The two principal advantages of their condition were, that they enjoyed municipal independence, had their own senate, chose their own local magistrates, and were not subject to the Roman prætor; and 2nd, that those who filled important municipal offices for one year in the colony acquired the full right of the Roman civitas, and, by transferring their domicile to Rome, might aspire to all the honours and offices of the republic.

At the time of the second Punic war there were thirty of these colonies in various parts of Italy. Twelve of them, after the battle of Cannæ, being weary of the protracted war, refused to give any further assistance in men and money against Hannibal, saying that the Romans ought to make peace with Carthage. These colonies were Ardea, Nepete, Sutrium, Alba, Carseoli, Cora, Suessa, Circeii, Setia, Cales, Narnia, Interamna. (Livy, xxvii. 9.) The other colonies remained faithful, continued to furnish their contingents, and were thus the means of saving Rome from destruction. These, it would appear from a passage of Cicero (*Pro Cæcina*, 35), received as a reward the commercium with Rome, or the faculty of acquiring Quiritarian ownership (Gaius, ii. 40), of taking by testamentary gift from Roman citizens, and of making a will according to Roman forms, &c.

When by the Julian law the people of Latium and other allies received the full Roman franchise, the Latin colonies shared also the boon. They obtained the civitas, all their citizens had the same civil rights as those of Rome, and if they came and settled at Rome, they enjoyed all the political rights. At this period therefore the old Latinitas, as a distinct civil condition of part of the inhabitants of Italy, was at an end.

But in the following year, under the consul Cn. Pompeius Strabo, the towns of Transpadane Gaul, which were filled with a mixed population of Italians and Gauls, had adopted the Latin language, and remained faithful to Rome in the midst of the defection of the Social war, were raised to the rank of Latin colonies, though no colonists were sent to them. By this new Latinitas, which was called 'Minus Latium,' or the 'lesser Latin franchise,' compared with the old Latinitas, the Transpadane towns continuing to govern themselves according to their own laws, were allowed the commercium, but not the connubium, with Rome; and they obtained such share of political privilege that persons who filled magistracies and offices of honour in such towns thereby acquired the full Roman franchise, and they alone. Afterwards many other towns and provinces were raised to the rank of Latin colonies in the same degree; as, for example, the towns of Sicily obtained it from Julius Cæsar.

This is the Latinitas, or Jus Latinum, which existed in later ages of the republic and under the empire, until Caracalla bestowed the Roman citizenship upon the provinces. The principal conditions of this Latinitas are expressed in the following passages of the fragments of Ulpianus:—(Tit. v., s. 4) 'Connubium habent cives Romani cum civibus Romanis: cum Latinis autem et Peregrinis ita, si concessum sit.' (Tit. ii., s. 16) 'Latinus habet quidem testamenti factionem.' (Tit. xix. s. 4) 'Mancipatio locum habet inter cives Romanos et Latinos colonarios, Latinosque Junianos, eosque Peregrinos quibus commercium datum est.' In the above passage there is another kind of Latini mentioned, namely, the Latini Juniani. This was a new kind of Latinitas, introduced by the Lex Junia Norbana, passed under the consulship of M. Junius Silanus and C. Norbanus Flaccus, in the tenth year of the reign of Tiberius, and the twentieth of our æra. By this law freedmen who were emancipated without certain forms (Gaius, i., 17, 22, &c.) and their offspring were placed not under the Jus Civium Romanorum, but under the Jus Latinum, and this even under peculiar restrictions. They had the commercium, but not the connubium. (Savigny, *Ueber die Entstehung und Fortbildung der Latinität als eines eigenen Standes im Römischen Staate*, in the *Zeitschrift für Geschichtliche Rechtswissenschaft*, 4th vol., 2nd No., Berlin, 1823.) Justinian (*Cod.*, b. vii., ch. 6) at last abolished this Junian or individual Latinitas, and as the Latinitas of the colonies had ceased long before, all distinction between Latin and Roman was then at an end.

The great importance which the Romans attached to the grant, not only of the political franchise or suffrage, but also of the connubium and commercium, was an effect of their exclusive policy. When they subdued a confederate people, such as most of the Italian nations were, they left to each town its laws and its local magistrates, but forbade the general assemblies of the nation; they restricted or entirely forbade the intercourse between one town and another, so that the people of each could not marry out of their respective district. They pursued afterwards the same policy in the countries which they conquered beyond the limits of Italy, as in Macedonia, which they divided into four parts, forbidding all communication between them.

We must now speak of the Jus Italicum. Sigonius understood it to be a sort of middle condition, between that of the Latini and that of the Peregrini, or aliens, with regard to Rome. But Savigny contends, and apparently with reason, that the Jus Italicum did not affect single individuals, but whole towns, namely, provincial towns out of Italy, to which it was granted, and that it consisted—1st, in the right of having their own free institutions and administration; 2nd, in being free from tax to Rome; 3rd, in having the ownership of property in the territory of those towns regulated according to the Quiritarian or Roman laws, and consequently subject to usucapion, cessio juris, mancipatio, and vindicatio. This last provision was an important security to property, and it placed the towns Juris Italici above all other provincial towns, whether governed by a prætor from Rome or liberæ, which had not the same right. Towns having the Jus Italicum are mentioned by Pliny in Spain and Illyricum; Constantinople is mentioned in the Theodosian code as enjoying the Jus Italicum, and in the Pandects (*De Censibus*, b. l., tit. 15) other towns are mentioned as possessed of the same right. (Savigny, *Ueber das Jus Italicum*, in the *Zeitschrift* above mentioned. See also, on the whole of this intricate matter concerning the Jus Latii and Jus Italicum, Sigonius, *De jure Antiquo Italiæ*: Cicero, *Pro Balbo*, with the *Notes* of Græevius and Manutius; Niebuhr's *History of Rome*.)

LATITUDE. [LONGITUDE AND LATITUDE.]

LATITUDE, METHODS OF FINDING. [LONGITUDE AND LATITUDE, METHODS OF FINDING.]

LATIUM, the country of the antient Latins, had at first for its boundaries on the west the Tiber, which divided it from Etruria; on the north, the Anio, which separated it from the Sabini; and on the south, the Tyrrhenian Sea. To the east and south-east its boundaries on the side of the Volsci are not so clear. In the first period of Roman history the Latin territory does not seem to have extended to the eastward beyond the Alban Mount, nor beyond a line drawn from that point to the sea-coast, leaving outside of it Satricum, Corioli, and Antium, which in the earlier ages of the republic appear as Volscian towns. And yet in the first treaty with the Carthaginians, said to have been concluded soon after the expulsion of Tarquin, Antium, Circeii, and Tarracina or Anxur, are reckoned as towns of Latium. Præneste however and Tibur appear from the first as Latin towns, the former being the advanced post of Latium on the side of the Hernici, who inhabited the mountainous tract between the Trerus (Sacco), the Upper Anio, and the Liris. Tibur, also a town of the Latini, was divided by the Anio from the territory of the Sabini. But the boundary of the Latin territory seems to have crossed the Anio below Tibur, and to have extended across to the Tiber above the

influx of the Allia, so as to include the towns of Nomentum and Crustumeria. At the time when the Latins entered into a fœdus, or league, with Rome in the consulship of Spurius Cassius and P. Cominius, we find the Latin cities or townships forming the Latin nation enumerated by Dionysius as follows: Ardea, Aricia, Bubentum, Corni or Corniculum, Carventum or Carnentum. Circeii, Corioli, Corbio, Cora, Fortinium (perhaps Foretii), Gabii, Laurentum, Lanuvium, Lavinium, Labicum, Nomentum, Norba, Præneste, Pedum, Querquetulum, Satricum, Scaptia, Setia, Tellene, Tibur, Tusculum, Toleria, Tricrinum, Velitræ. (Niebuhr, *Hist. of Rome*, vol. ii., note 21.) At that time therefore the Latin boundaries had encroached on the Volscian territory, and extended as far eastward as a line beginning from the sea-coast beyond Circeii, ascending northwards along the course of the Ufens, and including that part of the Lepini Montes on which Setia, Norba, and Cora stood. Antium, although encompassed by the Latin territory, did not belong to it, and was at war with Rome at the time of the Cassian treaty between Rome and the Latins. The sites of several of the above towns are unknown; Carventum and Toleria stood near Labicum, Corbio was on Mount Algidus, and Scaptia near Velitræ. Six centuries later Pliny (*Hist. Natur.*, iii.), in giving a list of the townships of the Prisci Latini, or old Latium, reckoned not less than fifty-three towns or communities which had become extinct long before his time, without leaving any traces behind, 'interiere sine vestigiis,' namely: Satricum, Pometia, Scaptia, Pitulum, Politorium, Tellene, Tifata, Cænina, Ficana, Crustumerium, Ameriola, Medullia, Corniculum, Saturnia (on the Palatine before Rome was built), Antipolis, which stood on Mount Janiculum, Antemnæ, Camerium, Collatia, Amitinum, Norba, Sulmo (at the foot of the Lepini, between Norba and Setia); and the following which used to share with the above the sacrifices on the Alban Mount—the Albenses, the Albani, Æsolani, Acienses, Abolani, Bubetani, Bolani, Cusvetani, Coriolani, Fidenates, Foretii, Hortenses, Latinienses, Longulani, Manates, Macrules, Mutucumenses, Munienses, Numinienses, Olliculani, Octulani, Pedani, Pallustini, Querquetulani, Sicani, Sisolenses, Tolerienses, Tutienses, Vitimellarii, Vilienses, Venetulani, Vitellenses. All these, says Pliny, were at one time 'clara oppida,' towns of some note in antient Latium. Independent of these there were still existing in Pliny's time—Ardea, Antium, Aricia, Alba Longa, Apiola, Algidum, Aurunca, Artona, Bovillæ, Cora, Circeii, Corbio, Fabium, Ficulnea, Forum Appii, Gabii, Laurentum, Labicum, Lavinium, Lanuvium, Mugilla, Nomentum, Norba, Ostia, Præneste, Setia, Suessa Pometia, Troia, Tibur, Tusculum, Ulubræ, Velitræ, all towns of the old Latium. It is surprising to see such a number of towns (and the existence of most of them is of historical certainty) in a small province, about 50 miles in length from the Tiber to Circeii, and about 30 in its greatest breadth from the Sabine Hills to the sea, a considerable part of this tract being even then occupied by marshes or by a barren soil of volcanic formation.

After the final conquest by Rome of the Volsci, the Hernici, and the Aurunci, the name of Latium was extended to the whole country inhabited by these three people, in addition to the country of the old Latins, and this was called Latium Novum. It extended to the eastward as far as the Liris, and included also a district on the left bank of that river, which once belonged to the Volsci, with the towns of Arpinum, Aquinum, Interamna, Atina, and Casinum. The other towns of this new Latium were Privernum, Tarracina, Amyclæ, Fundi, Caietæ, Formiæ, and, farther inland in the country of the Hernici, Anagnia, Ferentinum, Frusino, Verulæ, Aletrium, Signia, Tregillæ, and Fabrateria. Latium was in its extended sense bounded by Campania and Samnium to the east, by the Sabini to the north, the Tiber to the west, and the sea to the south. Under Augustus, Latium and Campania constituted the first of the eleven regions into which Italy was divided by that emperor.

The physical geography of Latium and the actual state of the country are given under Campagna di Roma, except the easternmost part of the new Latium, namely, the districts of Gaëta and Sora, which belong to Lavoro, Terra di. (Corradino and Volpi, *Vetus Latium Profanum*, 10 vols., 4to.; Cluverius, *Italia Antiqua;* Bonstetten, *Voyage au Latium;* Petit Radel; Madme. Dionigi; Dodwell; Sir W. Gell.)

LATREILLE, PIERRE-ANDRÉ, a French naturalist, particularly distinguished in the department of entomology, was born at Brives on the 29th November, 1762. Having shown an early taste for the study of natural history, and for literary pursuits generally, the Baron D'Espagnac, governor of the Hôtel des Invalides, brought him to Paris in 1778, and placed him in the college of the Cardinal Lemoine, to be educated for the church. Here he formed a friendship with the Abbé Haüy, who was a professor at the college. In 1786 he retired into the country, where he devoted all his leisure time to researches on insects. On going to Paris two years afterwards he formed an acquaintance with Fabricius, Olivier, and M. Bosc. Some curious plants which he presented to Lamarck procured him also the friendship of that great naturalist, whom he afterwards assisted in his lectures, and succeeded as professor in the Museum of Natural History. A memoir on the *Mutilles* of France (hymenopterous insects), which was inserted in the Acts of the Society of Natural History at Paris, procured him, in 1791, the title of correspondent to this Society, and, shortly afterwards, of the Linnæan Society of London. At this period he also wrote some of the articles on entomology in the 'Encyclopédie Méthodique.' Hitherto he had only devoted a small portion of his time to scientific pursuits, not allowing it to interfere with the duties of his profession; but the Revolution, which created so many reverses of fortune, obliged him to pursue for a living that study which he had only cultivated before as an amusement.

Being an ecclesiastic, he was devoted to persecution, and twice condemned to banishment, but he escaped this punishment through the influence of his scientific friends. Returning to Paris in 1798, he was named a correspondent of the Institute; and through the recommendation of Lacépède, Lamarck, Cuvier, and Geoffroy St. Hilaire, he obtained employment in the Museum, where he was appointed to arrange the collection of insects. When Lamarck became blind, Latreille was named assistant professor, and he continued Lamarck's lectures on the invertebrate animals till that naturalist's death, in 1829, when he filled the vacant chair of zoology.

The number of his literary productions is very considerable: 'Le Magazin Encyclopédique' of Millin; the 'Annales' and the 'Mémoires du Muséum;' and the 'Bulletin de la Société philomathique,' contain many papers and observations by him. In 1802 he published the 'Histoire des Fourmis,' which also contained several memoirs on other subjects, as on bees and spiders. Among his publications there is one which has been highly spoken of, and which differs in its object considerably from his other writings: this is a dissertation on the expedition of the consul Suetonius Paulinus in Africa, and upon the antient geography of that country. His memoirs upon the sacred insects of the Egyptians, and on the general geographical distribution of insects, excited the attention of all naturalists. Latreille's 'Précis des Caractères génériques des Insectes' (Brives, 1796) was the first work in which these animals were distributed in natural families, and it formed the basis of his 'Genera Crustaceorum et Insectorum' (Paris, 1806—1809, 4 vols. 8vo.), which is by far the best of all his productions. His 'Considérations générales sur l'Ordre naturel des Animaux composant les classes des Crustacés, des Arachnides, et des Insectes,' and the third volume of the 'Règne Animal' of Cuvier, are only extracts, more or less modified, of this work. The system by which the insects are arranged in the 'Règne Animal' (the entomological part of which, it must be remembered, was written by Latreille, though it all stands under the name of Cuvier) is pronounced by Mr. Swainson to be 'the most elaborate and the most perfect in its details that has yet been given to the world.' It soon superseded that of Fabricius. 'It possesses the advantage of being founded on a consideration of the entire structure of these animals, and hence gives us the first example, in theory, of the natural principle of classification.' In Sonnini's edition of Buffon, Latreille has given a general history of insects; he also wrote a 'Histoire des Salamandres,' and many other works.

Latreille, by the almost universal consent of naturalists, stood at the head of the department of entomology in his own and other countries. He deserved this place by his knowledge of the external and internal organization of insects, and by his acquaintance with their manners and habits.

Latreille was elected a member of the Academy of Sciences in 1814, and was made in 1821 Chevalier of the Legion of Honour. He died at Paris, 6th February, 1833, at the age of 70.

LATROBITE occurs crystallized and massive. Primary form a doubly oblique prism. Cleaves parallel to the primary planes. Fracture uneven. Hardness, 5·0 to 6·0. Scratches glass, but is scratched by felspar. Colour pale red. Lustre vitreous. Translucent, opaque. Specific gravity, 2·72 to 2·8. Heated on platina by the blow-pipe, gives a globule of an amethystine pale red colour: with phosphoric salt gives a yellow globule with a nucleus of silica.

Massive Variety.—Amorphous; colour pale red.

Found at Amitok Island, Labrador, and in Finland.

Analysis by Gmelin:—

Silica	44·653
Alumina	36·814
Lime	8·291
Oxide of Manganese	3·160
Magnesia	0·628
Potash	6·575
Water	2·041
	102·162

LATUS RECTUM. [ELLIPSE; HYPERBOLA; PARABOLA.]

LAUD, WILLIAM, was the son of a clothier at Reading in Berkshire, where he was born on the 7th of October, 1573. Laud was sometimes reproached during his prosperity with the meanness of his birth, which however was not more humble than that of most of the churchmen of his time, and indeed of preceding times; for in truth Laud himself was mainly instrumental in rendering the Church of England the resort of men of good or noble family as a profession.

Laud received his early education in the Free Grammar-School of Reading, from whence, in July, 1589, he was removed to Oxford and entered a commoner of St. John's College, where he successively obtained a scholarship and fellowship.

Even at the university Laud had the character of being 'at least very Popishly inclined.' Heylyn informs us that Dr. Abbot, master of University College, who was afterwards Archbishop of Canterbury, 'so openly branded him for a Papist, or at least Popishly inclined, that it was almost made an heresy (as I have heard from his own mouth) for any one to be seen in his company, and a misprision of heresy to give him a civil salutation as he walked the streets.'

In 1605 Laud had been appointed chaplain to Charles Lord Mountjoy, Earl of Devonshire. Laud, who held marriage to be an indissoluble sacrament, who raised a flame in Scotland by enforcing this point, and who censured in the high commission, and even imprisoned for adultery (which imprisonment he himself allows in his diary to be more than the law allowed), nevertheless performed the rites of marriage between his patron and Lady Rich, whose husband was then living, and who had previously carried on an adulterous intercourse with Lord Mountjoy.

On the death of the earl of Devonshire in 1608, Laud was appointed one of the chaplains of Neile, then bishop of Rochester, from whom he obtained considerable church preferment. His patron Neile, on his being translated to the see of Lichfield, and before his giving up the deanery of Westminster, which he held *in commendam* with his bishopric of Rochester, obtained for him the reversion of a prebendal stall there.

In 1611 he became president of St. John's College, Oxford; and it was now that Laud began seriously to turn his attention towards the church.

In 1616 the king conferred upon him the deanery of Gloucester, having some time previously appointed him one of his chaplains in ordinary. In 1617 he accompanied king James into Scotland for the purpose of modelling the Scottish church after the fashion to which he and Laud were desirous of bringing the church of England. On the 22nd of January, 1620, he was installed prebendary of Westminster, and on the 18th of November, 1621, consecrated bishop of St. David's. It was expected that Laud would have been made dean of Westminster in the place of Williams, who having been sworn privy-counsellor, and nominated to the see of Lincoln, received on the 10th of July the custody of the Great Seal on its being taken from Bacon. But Williams possessed such interest at court, that when he was made bishop of Lincoln he retained his deanery *in commendum*, together with the other preferments which he held at that time, viz. a prebend residentiary's place in the cathedral church of Lincoln, and the rectory of Walgrave in Northamptonshire; so that, observes Heylyn, 'he was a perfect diocese within himself, as being bishop, dean, prebendary, residentiary, and parson; and all these at once:' besides being at the same time keeper of the great seal of England.

Laud says, in his 'Diary,' that he resigned his presidentship of St. John's College, November 17th, 1621, 'by reason of the strictness of that statute which I will not violate, nor my oath to it under any colour:' yet the king had given him leave to hold it; but in truth avarice was never one of Laud's vices.

In May, 1622, the conference between Laud and Fisher the Jesuit took place. It was held in the presence of the marquis of Buckingham, who shortly after, as Laud himself informs us, 'was pleased to enter upon a near respect to him, the particulars of which were not for paper.' On the 15th of June he became 'C.' to Buckingham. It is thus he writes it in his 'Diary:' Some call it chaplain; others, among whom is Heylyn, confessor. It is certainly not usual for a nobleman even of the highest rank to have a bishop for his chaplain.

Laud was a great dreamer of dreams, and though he repeatedly affirms the contrary, he evidently attached much importance to them. The following extract from his 'Diary' is a specimen:—'December 14, Sunday night, I did dream that the lord keeper was dead; that I passed by one of his men that was about a monument for him; that I heard him say his lower lip was infinitely swelled and fallen, and he rotten already. This dream did trouble me.'

The lord keeper (Williams) had become jealous of Laud's growing favour with Buckingham, and he was incautious in betraying this jealousy. 'January 11, I was with his majesty to show him the epistle that was to be printed before the conference between me and Fisher the Jesuit, Maii 24, 1622, which he was pleased to approve. The king brake with me about the book printed then of the visitation of the church. He was hard of belief that A. B. C. was the author of it. My lord keeper mett with me in the withdrawing-chamber, and quarrelled me gratis.'

Laud's rise was now rapid. In 1626 he was made bishop of Bath and Wells, and dean of the Chapel Royal. On March 8th of this year he has the following entry in his 'Diary:'—'Dreamed that I was reconciled to the church of Rome.' In 1627 he was made a privy-counsellor. On the 11th of July, 1628, he says, 'My congé deslier was signed by the king for the bishopric of London.' About this time, on his acquainting the king with certain rumours spread abroad against him (Laud), Charles replied, 'That he should not trouble himself with such reports, till he saw him forsake his other friends.'

On the death of Buckingham, Laud plunged completely into his political career. Charles now looked upon him as his principal minister. It was at this time that the close union commenced between Laud and Strafford.

Laud commenced his career of statesmanship with a zealous persecution of the Puritans, or religious sectarians. Leighton, a physician, having published a book against the bishops, called 'Sion's Plea,' was sentenced by the court of Star Chamber to have his ears cropped, his nose slit, his forehead stigmatized, and to be whipped. Between the sentence and the execution of it Leighton escaped out of the Fleet, but he was retaken in Bedfordshire, and underwent this atrocious punishment.

In 1630 Laud was chosen chancellor of the university of Oxford. In 1632 he obtained for his creature Francis Windebanke the office of secretary of state; and in the same year Dr. Juxon was, he says in his Diary, sworn dean of his majesty's closet—'that I might have one that I might trust near his majesty.' Heylyn remarks, on the above proceedings, 'So that Windebanke having the king's ear on one side, and the clerk of the closet on the other, he might presume to have his tale well told between them; and that his majesty should not easily be prepossessed with anything to his disadvantage.'

On the 16th of August, 1633, Laud was appointed archbishop of Canterbury: he has the following entry in his Diary:—'August 4. That very morning (of Abbot's death) there came one to me, seriously, and that avowed ability to perform it, and offered me to be a cardinal: I went presently to the king and acquainted him both with the thing and the person.' 'August 17, Saturday. I had a serious

offer made me again to be a cardinal: I was then from court, but so soon as I came thither (which was by Wednesday, August 21), I acquainted his majesty with it. But my answer again was, that something dwelt within me which would not suffer that till Rome was other than it is.'

Laud made a declaration that in the disposition of ecclesiastical benefices he would give a preference to the single man over the married, *ceteris paribus*. The close union between the English church and the aristocracy appears to have commenced about this time. 'Under Laud,' remarks Heylyn, in his quaint phrase, 'the clergy were grown to such esteem for parts and power, that the gentry thought none of their daughters to be better disposed than such as they had lodged in the arms of a churchman; and the nobility grown so well affected to the state of the church, that some of them designed their younger sons to the order of priesthood, to make them capable of rising in the ascendant.'

Laud's letters to Wentworth, afterwards earl of Strafford, exhibit a more faithful mirror of the man's character than is anywhere else to be met with. His Diary, though it bears sufficient impress of his peculiar spirit, discloses his character but imperfectly, particularly as there are many apparently important facts only hinted at, and names of which only the initials are given. The history of his troubles and trial, by himself, and the voluminous life by Heylyn, were expressly written to vindicate his conduct and character. In perusing the letters between Laud and Wentworth the reader feels as if allowed to be present at a confidential conversation between those personages. The letters of Strafford, along with many indications of a violent, arbitrary, overbearing temper, exhibit evidence of strength and sagacity, and sometimes even of greatness of mind. Of the last-mentioned quality the reader will in vain search for any trace in the letters of the prelate. In courage and violence he did not yield to Strafford; but narrowness and littleness appear to have been the distinguishing characteristic of Laud's mind, and yet, contracted though his intellectual range was, some parts of his 'Conference with Fisher the Jesuit,' besides great scholastic learning, display considerable acuteness and no mean powers of reasoning.

On the 5th of February, 1634, Laud was appointed one of the great Committee of Trade and the King's Revenue; and on the death of Weston, lord high treasurer, the management of the treasury was committed by letters patent under the great seal to certain commissioners, of whom Laud was one. In the year following Laud and the Church of England attained a very high, perhaps it may be said the highest point of their prosperity. Laud thus records the event in his 'Diary:'—'March 6, Sunday, William Juxon, lord bishop of London, made lord high treasurer of England: no churchman had it since Henry VII.'s time. I pray God bless him to carry it so, that the church may have honour, and the king and the state service and contentment by it; and now if the church will not hold themselves up under God, I can do no more.'

The following passage from a letter of the Rev. G. Garrard, master of the Charterhouse, a correspondent of Strafford's, presents a lively picture of the state of feeling then prevalent among the clergy. It shows how near having an altogether ecclesiastical government England then was:—'The clergy are so high here since the joining of the white sleeves with the white staff, that there is much talk of having a secretary a bishop, Dr. Wren, bishop of Norwich, and a chancellor of the exchequer, Dr. Bancroft, bishop of Oxford, but this comes only from the young fry of the clergy; little credit is given to it, but it is observed they swarm mightily about the court.'

In a letter of 6th July, 1635, Laud thus speaks of the raising of ship-money:—'As the last year there was money raised upon the ports, according to antient precedent, for the setting out of the navy, which is now at sea, and there God bless it, so we are now going to prepare for a greater navy against the next year; and because the charge will be too heavy to lay it upon the ports, or maritime counties only, therefore his majesty hath thought fit, *a paritate rationis*, and for the like defence of the kingdom, to extend it to all counties and corporations within England and Wales, that so the navy may be full, and yet the charge less, as coming from so many hands. I pray God bless this business, for if it go well, the king will be a great master at sea, and in these active times we, by God's blessing, may be the more safe at land.' How effectively this money was applied to its ostensible object, the defence of the coasts and the putting down of piracy, may be gathered from the following passage in a letter to Wentworth during the following year:—'The mischief which the most Christian Turks did about Plymouth is most true, and I pray God it do no mischief about our shipping business this ensuing year.'

On the 14th June, 1637, sentence was passed in the Star Chamber against Bastwick, Burton, and Prynne, for libels, as Laud informs us in his 'Diary,' 'against the hierarchy of the church.' The archbishop does not however give any definition of what he meant by a libel against the hierarchy of the church. Prynne's sentence was, to be fined 5000*l.* to the king, to lose the remainder of his ears in the pillory, to be branded on both cheeks with the letters S. L. for Schismatical Libeller, and to be perpetually imprisoned. The sentence of Bastwick and Burton was nearly similar. Most people thought these men's punishment sufficiently severe: not so the primate, as will appear from the following passage of a letter to Wentworth, of August 28th, 1637 —

'I have received the copy of the sentence against Paterson, and am verily of your lordship's mind, that a little more quickness in the government would cure this itch of libelling, and something that is amiss besides.'

But the termination of Laud's career was now approaching. On the 18th of November, a few weeks after the meeting of the Long Parliament, he was impeached of high treason by the House of Commons, and committed to the Tower. It is impossible here to enter into the details of the archbishop's trial, of which he has himself written a full, and, on the whole, faithful account. (*History of his Troubles and Trial*, folio, London, 1695.) He defended himself throughout with courage and ability. The judges gave it to be understood that the charges contained no legal treason; whereupon the Commons changed the impeachment into an ordinance for his execution, to which the Lords assented. Laud produced a pardon from the king, which was disregarded. On this proceeding we quote the following remark from a modern publication:—'Laud's cruelty and bigotry and insolence in the execution of his high office ought assuredly not to have gone unpunished; but the sentence against him was perhaps the most unjustifiable act of the zealots of the Long Parliament, and was not less illegal than that which afterwards condemned Vane to the block; and in this appears strongly one of the disadvantages of government by a large assembly of men. The odium of Vane's death fell altogether upon Charles and Clarendon, and is of power sufficient, being thus concentrated, to brand their memory to all time. The odium of the death of Laud, being divided among so many, has neither brought with it individual infamy nor was likely to produce individual remorse.' (*Westminster Review*, vol. xvii., p. 508.)

It would be unjust to Laud not to mention his benefactions to learning. Besides making valuable donations of books and MSS. to the university of Oxford, he founded in that university a professorship of Arabic in 1636, and endowed it with lands in the parish of Bray, in the county of Berks. His conduct to John Hales, known by the appellation of the 'ever-memorable,' is also recorded to his honour. Hales had written a short tract on schism, which was much at variance with Laud's views of church government: this tract had been circulated in MS. Hales, in an interview with Laud, refused to recede from his free notions of ecclesiastical power, but promised that he would not publish the tract. Laud conferred on him a canonry of Windsor.

Laud was beheaded on the 10th of January, 1640-1.

(Laud's *Diary;* Heylyn's *Life of Laud;* Strafford's *Letters and Despatches.*)

LAUDANUM. [OPIUM.]

LAUENBURG, or SAXE-LAUENBURG, a duchy in Germany subject to the king of Denmark, is situated on the right bank of the Elbe, between 53° 22′ and 53° 47′ N. lat., and 10° 3′ and 11° 5′ E. long. It is bounded by the territories of Hanover, Mecklenburg, Holstein, Lübeck, and Hamburg, and has an area of 420 square miles, with a population of 37,500 inhabitants professing the Lutheran religion. The face of the country is level, with only a few hills: the soil is in some parts very fertile, while in others there are tracts of sand or extensive heaths; there are also large turf-moors and considerable forests, of which the largest is

that called the Sachsenwald. The rivers are the Elbe, Bille, Stecknitz, and Trave, which afford ample means for inland trade; and the Stecknitz Canal, between the Elbe and the Trave, opens a communication with the Baltic at Lübeck. The most considerable lakes are those of Schaal and Ratzeburg. Its natural productions are corn, flax, timber, turf, horned cattle, sheep, poultry, fish, &c., more than sufficient for home consumption. The inhabitants are chiefly engaged in agriculture and the carrying trade both by land and water; and their exports are pretty considerable, especially of timber and fuel. They have no manufactures.

Lauenburg had formerly its own dukes, whose family became extinct in 1689, on the death of Duke Julian Francis. It was then taken possession of by George William duke of Brunswick-Lüneburg as a portion of the dominions of Henry the Lion, conformably to a convention concluded in 1639 between the dukes of Brunswick-Lüneburg and Lauenburg, and being incorporated with Brunswick-Lüneburg, subsequently formed part of the electorate of Hanover. In 1805 it was taken possession of by the Emperor Napoleon, and in 1810 incorporated with the new French department of the Mouths of the Elbe. In 1814 Lauenburg was restored to its former sovereign George III. as king of Hanover; but by the rather complex arrangements subsequent to the peace of 1815, Sweden, which had deprived Denmark of the kingdom of Norway, ceded Swedish Pomerania to Denmark, and Prussia ceded East Friesland to Hanover, in exchange for the duchy of Lauenburg, Hanover however retaining the small tract on the left bank of the Elbe and the detached bailiwick of Neuhaus on the right bank (making together 105 square miles, with 10,000 inhabitants). Prussia then exchanged Lauenburg with Denmark for Swedish Pomerania; but as the latter province was more valuable, Prussia paid to Denmark two millions of Prussian dollars. It also paid a debt of 600,000 Swedish bank dollars, which Sweden owed to Denmark, and paid besides 3,500,000 dollars to Sweden.

The chief towns are *Lauenburg* (3500 inhabitants) on the Elbe, at the mouth of the Delvenau or Stecknitz Canal, by which goods are conveyed from the Elbe to Lübeck; *Ratzeburg*, the capital, a well-built town on an island in the Ratzeburg Lake, has extremely fine views over that great lake: it is connected with the left bank by a causeway, and with the right by a bridge 1100 feet in length (population 2500 inh.); *Mollen* on the Stecknitz, the burying-place of the famous Till Eulenspiegel, of whom various relics are still shown there.

LAUGHARNE. [CAERMARTHENSHIRE.]

LAUGHTER, as physically defined, is a peculiar agitation of the body, as it were, an organical titillation, which rising suddenly and irresistably, affects at once the face and throat, the thorax and the abdomen. Although this physical phenomenon is usually more or less loud, it is sometimes almost imperceptible, and only traceable by a slight muscular motion of the face and mouth. While however the corporeal phenomenon is so simple, the nature of the mental state, and of the object by which it is produced, is more complicated and debateable. On this subject a great variety of opinions has prevailed. Among the antients there is more of unanimity than among the moderns. According to Aristotle, the ridiculous is some error in truth or propriety, but at the same time neither painful nor pernicious (*τὸ γάρ γελοῖον ἐστὶν ἁμάρτημά τι καὶ αἶσχος ἀνώδυνον καὶ οὐ φθαρτικόν. De Poet.*, 6, § 1). Nearly coincident with the foregoing is the view of Cicero, who while he declares that the ridiculous is incapable of any rigorous definition, admits that the chief, if not the sole object of laughter, is that which, without impropriety, marks out and exposes an impropriety ('Hæc enim ridentur vel sola vel maximè quæ notant et designant turpitudinem quandam non turpiter:' *De Oratore*, 2, n. 235). Quintilian considers it to be absolutely indefinable ('Anceps ejus rei ratio est,' lib. vi., c. 3). At the same time, by adducing the opinion of Cicero, that the improper and the deformed constitute the province of ridicule, and affirming that ridicule is near allied to contempt ('a derisu non procul abest risus:' *Ibid.*), he approximates to the strong opinion of Hobbes among moderns, according to whom, the source of laughter is 'a sudden glory arising from conception of some eminency in ourselves, by comparison with the infirmity of others, or with our own formerly' (*Human Nature*, ch. ix., s. 13). With Hobbes's opinion, that of Helvetius coincides, who makes pride the source of laughter. Beattie and Priestley agree in making the ridiculous to arise out of a misrelation or incongruous union of objects; while Lord Kames considers a contrast to be the essence of the laughable. The latter view is adopted by Mendelsohn and J. Paul Richter. The former (*Dialogue* iii., *Klein phil. und æsth. Schriften*) makes it to be grounded on a contrast between perfection and imperfection, which however must be unimportant and but slightly interesting to us, and must amount to no more than an extravagance or inconsistency. The latter (in his 'Vorschule d. Æsthetik,' p. 143) makes the ridiculous to be the contrary of the sublime, and consequently the infinitely small. Closely coincident with this view is that of Campbell ('Philosophy of Rhetoric,' bk. i., ch. ii.), who observes that 'ridicule in futile objects hath a similar effect to that produced by what is called the vehement in solemn and important matters.' Lastly, Kant (*Kritik d. Urtheilskraft*, p. 225, 2nd ed.) makes the ridiculous to arise from the sudden conversion into nothing of a long-raised and highly-wrought expectation.

According to Shaftesbury ('Characteristics;' 'Essay on Wit and Humour') ridicule is the test of truth, and he adduces in support of his view the words of Gorgias of Leontini, 'Confute ridicule by seriousness and seriousness by ridicule' (*τὴν μὲν σπουδὴν διαφθείρειν γέλωτι, τὸν δὲ γέλωτα σπουδῇ*. Arist., *Rhet.*, lib. 3, ch. xviii.). In order to adjust the sentence to his own view, Shaftesbury adopts the Latin version, 'seria risu, risum seriis *discutere*;' it is however clear from the context where the passage is quoted, that Gorgias was there recommending an orator to endeavour to remove the impression, which his opponent may have made upon his auditors, by employing a directly opposite style of address. But the maxim of Shaftesbury admits only of a negative application, for ridicule, at most, is only fitted to refute error. In truth however it is not properly levelled at the false, but at the absurd in tenets and opinions. The ridiculous is not any fixed and constant property of certain objects, but it is purely relative and dependent upon the subjective states and conditions of individual minds. The simpleton and the boor laugh heartily at what scarcely provokes a smile in the educated man and the sage; and on the other hand, much will excite a laugh in the latter, which would not move a muscle in the face of the former. Such again is the effect of a gay or a gloomy temperament, that a Democritus will laugh where a Heraclitus would weep.

LAUMONITE occurs crystallized and massive. Primary form an oblique rhombic prism. Cleaves parallel to all the faces of the primary form and to the diagonal planes. Fracture uneven. Hardness, scratched by carbonate of lime. Colour white, sometimes yellowish and reddish. Streak white. Lustre vitreous and pearly. Translucent, opaque. Specific gravity 2·3. The crystals fall to powder by exposure to the air, on account of the loss of water.

Massive Varieties amorphous, structure granular.

Gelatinizes in nitric acid. Before the blowpipe swells up before fusion, and gives a white enamel, which, by a continued heat, is converted into a transparent glass.

It is found in Scotland, Ireland, France, Hungary, and Iceland.

Analysis by Gmelin—

Silica . . .	48·30
Alumina . . .	22·70
Lime . . .	12·10
Water . . .	16·
	99·10

LAUNCESTON (also called *Dunheved*), a corporate town in the county of Cornwall, of which it is usually regarded as the capital. It is pleasantly situated on a steep hill rising from the banks of the Attery, a few miles above the confluence of that stream with the Tamar, and 210 miles west-south-west from London. The houses are in general mean and irregularly built, and the streets narrow and inconvenient. Within the last few years the town has been greatly improved, and is now lighted with gas, the expense of which is defrayed by a rate.

Both the assizes for the county of Cornwall were formerly held at Launceston (by virtue of a charter from Richard, king of the Romans), but by the stat. 1 Geo. I., c. 45, the summer assizes were removed to Bodmin, and in consequence of the completion of new courts at the latter place in 1838, and the situation of the county gaol there, both assizes are now held at Bodmin.

The corporate revenue, arising principally from tolls,

markets, fairs, &c., amounted in 1835 to 285*l.* per annum, which was about sufficient to cover its ordinary expenditure.

Until the passing of the Reform Act the borough had returned two members to parliament continuously from the reign of Edward I., the right of election being vested exclusively in the mayor, aldermen, and freemen. By the Reform Act, Launceston and the adjoining borough of Newport are included in a district, and both together now return one member. Launceston is one of the polling places for the eastern division of the county.

The remains of the antient castle of Launceston are very remarkable. King, in his *Munimenta Antiqua*, vol. iii., describes it minutely, and assigns to it the most remote antiquity, on account of its dissimilarity from castles built by the Romans, Saxons, Danes, or Normans.

The church, dedicated to St. Mary Magdalen, is in the diocese of Exeter, and the living, a paid curacy of the net annual value of 116*l.*, was, until the passing of the Municipal Corporation Reform Act, in the patronage of the corporation. It is a very remarkable structure, composed of granite, ornamented with scriptural devices, and curious carved work.

The grammar-school of Launceston was originally endowed by Queen Elizabeth, and subsequently by the duke of Northumberland. In the year 1811 the corporation erected a new school-house at an expense of 1000*l.*, but the first master having absconded, and the second resigned, no new appointment has been made since the year 1821 (*Corp. Reports*, 1835), neither has the revenue been received since that date, in consequence of which the house has become dilapidated and no longer fit to be inhabited. The fees were six guineas per annum, on the payment of which the school was open to the children of any inhabitant. The population of the town in 1831 was 2231, and had increased about 50 per cent. since the census of 1801. (*Parliamentary Papers;* Gilbert's *Parochial History of Cornwall*, vol. ii., p. 417; &c.)

LAURA'CEÆ, a natural order of apetalous Exogens, consisting entirely of trees and shrubs, inhabiting the warmer parts of the world, and in most cases aromatic, on which account several are mentioned in works on officinal plants. The best known species in Europe is Laurus nobilis, the Sweet Bay, a beautiful evergreen, whose fragrant leaves are commonly employed to flavour confectionary. [LAURUS.] Other products of the order are, cinnamon and cassia; sassafras, whose bark has great reputation in North America as a powerful sudorific; Pichurim beans, an indifferent substitute for nutmegs; and finally, not to mention other useful substances, camphor, obtained by the Chinese from the Camphora officinarum by means of dry distillation.



1. A flowering branch of Laurus nobilis; 2. One of the flowers, much magnified; 3. A stamen, with a pair of glands on its filament and the anther opening by two recurved valves; 4. a seed; 5, a section of the same, exhibiting a minute embryo.

In general it may be expected that the trees of this order are valuable as aromatics and stimulants, although but a comparatively small number has yet been brought into use. They are known by the peculiar structure of their flowers, which have no corolla, stamens in one or several rows, often in part gland-like and sterile, a simple one-celled superior one-seeded ovary, and especially by the anthers bursting with recurved valves.

LAUREATE, POET, an officer in the lord chamberlain's department of the royal household. The appellation 'laureate' seems to have been derived through the Italian, from the Latin *laurus*, 'a bay,' in allusion to the antient practice of crowning poets. Petrarch received the crown at Rome in 1341, and Tasso in 1594. The earliest mention of a poet-laureate in England, under that express title, is in the reign of Edward IV., when John Kay received the appointment. Warton however, in his 'History of English Poetry,' shows that the poet-laureate is undoubtedly the same officer who, in the reign of Henry III., is styled *Versificator regis*, the 'king's versifier,' and to whom a hundred shillings were paid as his annual stipend. Ben Jonson is said to have been the poet-laureate to King James I. In the reign of Charles I., 1630, the first patent of this office appears to have been granted, which fixed the salary or pension attached to it at 100*l.* a year, with an additional grant of a tierce of Canary wine from the king's stores. The succession of poets-laureate since the time of Charles II. has been—John Dryden, Nahum Tate, Nicholas Rowe, Laurence Eusden, Colley Cibber, William Whitehead, Thomas Warton, Henry James Pye, and Robert Southey. A commutation was agreed to of 27*l.* for the allowance of wine, by the last poet-laureate.

(Warton, *Hist. Engl. Poetry*, vol. ii., pp. 131, 132; Hawkins's *Hist. of Music*, vol. iv., p. 13.)

LAURINE, an acrid and bitter principle contained in the berries of the laurel; its smell resembles that of laurel oil. It is insoluble in water, and little soluble in cold alcohol, but more so in boiling alcohol and in æther; it crystallizes from solution in needles. When heated it melts, and volatilizes without leaving any residue. To sulphuric acid it first imparts a yellow and afterwards a reddish-yellow colour; in cold nitric acid it liquefies, and floats upon its surface; it bears considerable resemblance to solid expressed oils, but has not been analyzed; the berries contain only about one per cent. of this substance.

LAURUS, a genus of the natural family of Lauraceæ, to which indeed it has given its name. It includes as a species one of the most celebrated trees of antiquity, and until recent times some of the most elegant and useful of the vegetable kingdom, as among them were the trees yielding the camphor of Japan, Cinnamon, both of China and of Ceylon, Cassia bark and buds, the Malabathrum leaf of the antients, with the less known Culilawan and Sintoc barks, as well as the American Persea, Pichurim, and Sassafras. Most of these are however now placed in distinct genera by the latest authors who have paid attention to the subject, as Nees von Esenbeck and Blume, as will be noticed in the articles dedicated to the different substances.

The camphor-tree is admitted by all authors to be the Laurus camphorifera of Kaempfer, now the *Camphora officinarum* of Nees, a native of Japan and of the province of Fokien in China, and also of the island of Formosa, whence, according to Mr. Reeves, the chief portion of the camphor of commerce is brought to Canton. As the wood is said to be valuable, the root, refuse wood, and smaller branches are cut into chips, covered with a little water, and the camphor separated by sublimation. [CAMPHOR.] It is necessary to distinguish this camphor from that produced in Borneo and Sumatra by Dipterocarpus, or Dryobalanops Camphora.

The kinds of cinnamon are not so clearly settled, as there is both a Ceylon and a Chinese cinnamon. The former however is no doubt produced by *Cinnamomum zeylanicum*, and the latter by the *C. aromaticum* of Nees. This cinna-

mon is of superior quality, at least some of it, and is preferred by the Chinese to that of Ceylon, and said to be produced in Cochin China chiefly in the dry sandy districts lying north-west of the town of Faifoe, between 15° and 16° N. lat. Mr. Crawfurd (*Embassy to Siam*, p. 478) informs us that there are ten varieties of it, and that it is not cured, like that of Ceylon, by freeing it from the epidermis. Dr. A. T. Thomson gives this as one of the characters by which cassia may be distinguished from cinnamon. It is possible therefore that some of it may be imported into Europe, and sold as cassia, though Mr. Marshall states that the cassia bark of the shops is only a coarse cinnamon obtained from the thick roots or large branches of the cinnamon-tree.

Cassia buds, or Flores Lauri Cassiæ, are the dried receptacles of some species of this family, by some supposed to be the above C. aromaticum, but it has been pointed out by Loureiro, and is named C. Loureirii by Nees. It is a native of Cochin China towards Laos, and of Japan.

It has sometimes been doubted whether the substances we now call *cinnamon* and *cassia* are exactly the same things as those to which the antients applied these names. It is very certain that the substances which formed such highly esteemed articles of commerce must have possessed some remarkable physical and sensible properties not common in products beyond the tropics. The aromatic principle is that which is most conspicuous in the products of the tropical zone, and is found probably in most of the substances which the antients obtained from the East, at least Dioscorides has described them all together. It would be difficult even with our present knowledge to find any other substances which would equally well answer the antient descriptions, without going still farther east. The Greek name of cinnamon is *κιννάμωμον*, which Herodotus says his countrymen learnt from the Phœnicians, and the Hebrew, we know, is *kinnemon*. It is remarkable that the Malay name is kayu-manis, which Mr. Marshall says is sometimes pronounced as if written *kaina-manis*. By the Hindus cinnamon is called *dar-cheenee*, indicating that they obtained it from the Chinese; and Professor Wilson has lately proved that there was commerce by sea with China at a very early period, and, what is still more remarkable, that the navigators were Hindus.

The Culilawan bark, often written Culibaban, or Culitlawan, said to be derived from *kulit*, bark, and *lawan*, clove, in some measure resembles Cassia. It is one of those which has been known in Europe since the seventeenth century, but has been little used in modern times, though Blume describes it as possessed of remarkable properties in curing diseases. Analyzed by M. Schloss, it was found to yield a resin, a volatile oil, and a bitter extractive substance. A volatile oil obtained from it in Amboyna is used as a stimulant, according to Labillardiere. It was formerly employed in Europe as an aromatic stimulant, and must be useful in cases where such remedies are indicated. The tree yielding it is a native of Amboyna, and is called Cinnamomum Culilawan by Blume.

The Laurel, or Sweet Bay, now alone remains in the genus Laurus, and is the L. nobilis of Linnæus, a native of the north of Africa and south of Europe, and of Asia; at least it has been so long naturalized in these countries that it would be difficult to ascertain whence it was originally introduced. It is the *δάφνη* of the Greeks, and is known to the Arabs by the name *ghar*, with *zafne* as its Greek synonyme. The berries are even found in Indian bazaars by the name *hubal-ghar*.

The Bay-tree attains a height of 20 or 30 feet, and is cultivated in gardens, not only on account of its elegant appearance, but also for the aromatic fragrance of its leaves, which are evergreen, lanceolate, wavy at the margin, and quite smooth. The flowers are small, four or five clustered together in the axils of the leaves, of a yellowish-white colour, and dotted. The fruit is small, ovate, dark purple coloured, and a little succulent. It is endowed with aromatic properties as well as the leaves, whence both have long been used in medicine as stimulants and carminatives, as well as a fatty oil expressed from the seed, which however, retaining a portion of the volatile oil, has a fragrant smell. The term bachelor has by some been supposed to be derived from the former practice of crowning candidates for honours with bay-leaves and berries, whence the terms *baccalaureus* and laureate.

LAUSANNE, the head town of the Canton de Vaud, in Switzerland, is situated about a mile and a half from the northern shore of the Leman lake, on three steep hills, divided by deep ravines, and which are projections of the ridge of Jorat, on the central high land of the Canton de Vaud. The highest of these ridges, upon which the old cathedral is built, is 500 feet above the lake, and about 1700 above the sea. The situation of Lausanne is picturesque, but the interior of the town is far from pleasing; the streets are mostly narrow, very steep, and ill paved. The cathedral, a vast Gothic structure of the eleventh century, is the handsomest in Switzerland, is adorned with a lofty tower, and also a spire 200 feet high. The church of St. Francis is also a very old building, and is memorable for the council assembled there in 1449, in which Felix V. solemnly resigned the papacy in order to restore peace to the Western church. [AMADEUS VIII.] The castle, formerly the residence of the Bernese bailiffs or governors, is now the government-house, and the legislative council of the canton assembles in one of its halls. The other remarkable buildings of Lausanne are—1, the college, or academy, which contains the various classes of belles-lettres, theology, and law, the normal school, or school for teachers, the cantonal library, with 33,000 volumes, the library for the students, and a museum containing collections of mineralogy, botany, zoology, &c.; 2, the penitentiary, established in 1822, which is considered a model of its kind; 3, the new building of the charity-schools, which are possessed of a capital of about 10,000*l.* sterling; 4, the casino, or club-house; 5, the old episcopal palace near the cathedral, which now contains the hospital, the prisons, and the elementary schools.

At the census of 1835 Lausanne contained 12,030 inhabitants, exclusive of the numerous visitors of all nations who constantly resort to it. The bulk of the inhabitants are of the Swiss Protestant church, and the town is divided into four parishes. There is a Catholic congregation, who built for themselves a church in 1835. The Lutherans have a chapel, which is also used by the English, who are always in considerable numbers here, and for whom there is a clergyman of the Church of England generally residing at Lausanne.

The Canton de Vaud is essentially agricultural, and Lausanne has no extensive or important manufactures. There are above 500 'rentiers,' or persons who are possessed of independent income, about 200 shopkeepers, 400 journeymen labourers or mechanics, 1300 servants, 150 individuals employed under government, 98 inns and public-houses, and about 30 factories of various kinds, tanners, spinners, paper-makers, printers, lithographers, &c. Some trade is carried on in wine, which is the staple produce of the country. (Lereschc, *Dictionnaire Géographique de la Suisse*.)

The environs of Lausanne are delightful, on account of the variety of sites, the richness of the vegetation, the numerous fine country-houses with which the neighbourhood is studded, and the splendid scenery embracing the whole basin of the lake, the Alps of Savoy, those of the Valais, and the chain of the Jura. Society at Lausanne is also very pleasant, and easily accessible to strangers. A rapid descent of little more than a mile leads from Lausanne to the village of Ouchy, on the shore of the lake, where the steam-boats from Geneva and Villeneuve daily put in. The house and garden in which Gibbon wrote the greatest part of the 'Decline and Fall' are still shown at Lausanne. Gibbon's library, of more than 2000 volumes, many with marginal notes in his own hand, which had remained at Lausanne ever since his death, was sold a few years since, when most of the books were purchased by Englishmen. [VAUD, CANTON OF.]

LAUSITZ, or LUSATIA, UPPER and LOWER, formed, before the partition of which we shall presently speak, a margraviate, and extended from 50° 50′ to 52° 16′ N. lat., and from 13° 20′ to 15° 15′ E. long. It was bounded on the north by Brandenburg, on the east by Silesia, on the south by Bohemia, and on the west by Saxony. The area was 4336 square miles, and the population about half a million of inhabitants. Upper Lausitz is the larger portion of the margraviate, its area being 2289 square miles. The surface is in general a sandy plain. Along the southern frontier runs a mountain-chain called the Wolische Kamm, which is connected on the east with the Riesengebirge, and on the west with the Erzgebirge. The ridge of this chain, which properly belongs to Bohemia, is the greatest elevation of Upper Lausitz. The rock is granite

and porphyry, frequently interrupted by basalt; only on the southern side there is sandstone. Towards the north the country declines into the sandy plain. All the rivers rise in the above mountain-chain, and flow northwards to Brandenburg and Meissen, or eastwards towards Silesia. The principal are the Black Elster, which receives the Schwarzwasser, the Spree, and the Neisse, with their numerous affluents. The first two flow into the Elbe, and the last into the Oder. The Pulsnitz divides Upper Lausitz from Meissen, and the Queiss divides it from Silesia. The alternation of plain and mountainous tracts gives Upper Lausitz a great variety of picturesque and beautiful scenery. Though the country is very carefully cultivated, it produces scarcely half as much corn as the numerous population requires. Flax is grown everywhere, but scarcely a sixth part of what is wanted for the manufactures. Here and there some buckwheat and millet are grown. Potatoes are very abundant. Timber is plentiful in some parts, but scarce in others; it is most abundant in the north-west corner, where resin, pitch, and tar are prepared. The breed of horned cattle is good; that of sheep is much attended to, and has been greatly improved by the introduction of merinos. The Wends (or Vandals) rear great numbers of good horses, and are famous for breeding vast quantities of geese. The breeding of bees has been very particularly attended to, and there is a Bee Society under the patronage of the king of Saxony. In the northsome bog ore is found, which employs a few forges: and large quantities of alum are obtained in the Muskau Heath. In the south there are extensive turf moors, and near Zittau there are mines of coal. The great majority of the population are employed in manufactures; in the towns they make woollens and stockings, and in the villages, several of which have from 3000 to 5000 inhabitants, they weave various sorts of goods, which formerly included linen of all kinds. The damask-weavers of Gross Schonau near Zittau, a village with 4000 inhabitants, manufacture table-linen, the brilliancy and fineness of which have never yet been equalled by any other damask manufactory. The great wholesale trade which the merchants of Upper Lusatia formerly carried on with their manufactures, especially that of linens, has very much declined within these fifteen years; but considerable quantities of woollens and table-linen are still exported to Italy, Russia, and America.

Lower Lausitz, which is the northern part of the margraviate, is the smaller portion, its area being only 2047 square miles. A great portion of it is covered with moving sands, and there are large marshes on the banks of the rivers, the principal of which are the Oder, the Spree, and the Neisse. Agriculture is in a backward state: there are raised however some wheat, barley, and millet for exportation, and tobacco, flax, and hops are cultivated to a considerable extent. Horses and horned cattle are few in number; sheep and swine are in abundance. The breeding of bees is very general. Timber is more plentiful than in Upper Lausitz, and the Spree Wald is a considerable forest. There are no minerals of any importance. The manufactures are linen and woollen; the linen manufacture, though important, is far inferior in extent to that of Upper Lausitz.

After the immigration of the northern hordes Lausitz was inhabited by tribes of the Slavonian Sorbi, the ancestors of the present Wends, who were subdued in 928 by Henry I., king of the Germans, and converted to Christianity in 968 by Otho I. From that time its history presents a continual change of masters. In 1620 Lausitz and Silesia having revolted in consequence of the religious oppression of the emperor Ferdinand II., John George I., elector of Saxony, reduced those provinces to obedience in the name of the emperor, and retained Lausitz as a security for 6,000,000 florins due to him by the emperor for the cost of his expedition. In the treaty of Prague, 1635, it was wholly ceded to the elector as a fief of Bohemia, and remained united with Saxony till the peace of Tilsit, 1807, when the circle of Kottbus, which is wholly surrounded by it, and till then had belonged to Brandenburg, was incorporated with it: but by the decision of the Congress of Vienna in 1815 Saxony was obliged to cede the whole of Lower Lausitz and the half of Upper Lausitz to Prussia; so that the Prussian portion of the antient margraviate has an area of about 3216 square miles, and is divided between the governments of Frankfort and Liegnitz. The part left to Saxony forms the circle of Lausitz, and has an area of 1120 square miles (some writers say only 820, giving 300 more to Russia), with 224,584 inhabitants, of whom 35,000 are Wends, who still retain their own language, which differs very little from the other Slavonian dialects, and have partly their own peculiar costume and many national habits, to which they are passionately attached. They are a well-made, robust, brave, and industrious race of men. (Hassel, *Handbuch*; Stein, *Geog. Lexicon*; Schlieben, *Vaterlandskunde*.)

LAVA, in geology, the most general designation of the mineral substances which are erupted in a melted state from volcanic vents. The situation of volcanos now extinct may often be recognised by their solidified products, even when the characteristic conical figure of volcanic mounds has been destroyed by time; and it is commonly supposed that 'volcanic rocks' may be distinguished from 'trap rocks,' the effects of heat in antient geological periods, by some peculiarities of aggregation, which appear due rather to the dissimilar circumstances under which the lava was solidified than to any essential difference in the chemical constitution or mineral components.

Dr. Daubeny presents, in his 'Essay on Volcanos,' p. 381, the following general view of the appearance and heat of lava: 'When observed as near as possible to the point from whence it issues, it is for the most part a semifluid mass of the consistence of honey, but sometimes so liquid as to penetrate the fibre of wood. It soon cools externally, and therefore exhibits a rough unequal surface, but, as it is a bad conductor of heat, the internal mass remains liquid long after the portion exposed to the air has become solidified. The temperature at which it continues fluid is considerable enough to melt glass and silver, and has been found to render a certain mass of lead fluid in four minutes, which, placed on red-hot iron, required double that time to enter into fusion.'

Lavas vary so much in chemical composition and mineralogical aspect, that it might seem impossible to reduce them to a general rule. Yet as among the older products of heat we distinguish two principal groups depending on the relative abundance of felspar and hornblende (or augite), so among the products of modern volcanos a similar consideration clears away much of the perplexity which belongs to this subject.

According to Von Buch, almost all lavas are to be viewed as a modification of trachyte, consisting essentially of felspar and united with titaniferous iron, to which they owe their colour and their power of attracting iron; they generally contain glassy felspar; and often enclose augite, leucite, hornblende, mica, olivine, specular iron, and many other minerals, developed by crystallization from the fused mass. Trachyte, one of the most prevalent of all volcanic products, consists chiefly of felspar (90 per cent.), and includes almost every conceivable modification between porphyry and obsidian.

Basalt, another of the characteristic volcanic rocks, contains, besides much felspar, a considerable admixture of augite or hornblende, and is rich in oxide of iron, sometimes titaniferous.

If lava were wholly felspathic it would consist principally of silica, alumina, and potash, as in column 1, the average of seven analyses of felspar: if wholly hornblendic, as in column 2, which expresses the composition of hornblende from the Vogelsberg, according to Bonsdorff; if wholly augitic, as in column 3, which is the analysis of black augite from Ætna by Vauquelin.

	(1.)	(2.)	(3.)	(4.)
Silica . .	64·0	42·2	52·0	51·
Alumina .	18·9	13·9	3·3	19·
Lime . . .	0·8	12·2	13·2	9·5
Magnesia .	—	13·7	10·0	—
Potash . .	13·7	—	—	—
Soda . . .	—	—	—	4·0
Oxide of iron	0·8	14·6	14·7	14·5
&c.	—	—	6·8	—

The fourth column gives, for comparison, the result of Dr. Kenneay's examination of the compact lava from Catania. Soda, an ingredient of compact felspar, appears more frequent in lavas than potash, which belongs to common felspar; magnesia is not common, its place in the chemical aggregate being probably occupied by oxide of iron. [AUGITE.]

Trachyte is conjectured by Dr. Daubeny to be derived from granite; and some volcanic products present in their chemical composition a remarkable analogy to that of granite. Obsidian, of which a specimen from Heola yielded to Vauquelin—

Silica	78	Lime	·1
Alumina	10	Soda	1·6
Potash	6	Oxide of iron	1·

is by the same writer spoken of as derived from trachyte.

In comparison with this we may place the composition of granite as calculated by M. De la Beche from its constituents, viz.:

Silica	74·8	Magnesia	1·0
Alumina	12·8	Oxide of iron	1·9
Potash	7·5	&c.	0·3
Lime	0·4		

The certainty with which the mineral ingredients of lava can be identified depends principally on the degree of crystallization which circumstances have permitted, and this on the rate of cooling and pressure to which the melted masses have been subjected. There is in lava every degree of variation, some specimens being of granitic, others of earthy, compact, resinous, or vitreous texture. Yet in most cases the method of mechanical analysis proposed by Cordier will determine, what very often a lens detects, the real mixture of various minerals in what seems a homogeneous mass. According as felspar or augite predominates, volcanic rocks have been classed, by Cordier and most writers, as trachytic and basaltic. Mr. Scrope (*Journal of the Royal Institution*, vol. xxi.) has proposed an intermediate group to be called greystone. He states that in trachyte, felspar (or its substitute) exists in the proportion of 90 per cent. and upwards, in greystone more than 75 per cent., and in basalt less than 75 per cent. The specific gravity of trachyte is about 2·7, of greystone 3·0, of basalt even 3·5; differences which correspond with their chemical composition. The colours yielded by these rocks, when melted by the blowpipe, afford a good test for the fine-grained sorts. The glass from trachyte is light coloured and nearly transparent; greystone gives a darker glass with green or black spots; basalt is changed to a dark green or black enamel. According to conditions of solidification,—in water, in air, or in fissures of the earth,—the minerals which occur in lava are variously distributed so as to give it porphyritic, amygdaloidal, or concretionary characters; and the masses appear compact, porous, cellular, vesicular, cavernous, spumous, or filamentous—and all these circumstances are observable in glass and other products of artificial heat, which are subject to unequal rates of cooling and under different circumstances. [VOLCANO.]

LAVAL, a town in France, capital of the department of Mayenne, 169 miles west of Paris, through Dreux, Alençon, and Mayenne. The town is situated on the slope of a hill on the right or west bank of the Mayenne, and consists of steep, narrow, crooked, and dirty streets. The principal suburb, which is on the left bank of the Mayenne, is better built: it is about a third as populous as the town. The buildings of the town are mostly antient. There is on the bank of the river an antient castle of great extent: it was in former ages the residence of the dukes of Laval, and, after them, of the dukes of La Tremouille; it is now used as a prison. It has a lofty round keep or donjon. Another building somewhat more modern is used as a court of justice. There are three churches; those of La Trinité and St. Vénérand exhibit a curious mixture of antient and modern architecture. There is a handsome linen-hall in the upper part of the town; and two 'places' or squares laid out as promenades. The population of Laval in 1836 was 17,810. The chief manufacture of the town is of linen-thread, damask table-cloths, and other linen goods, calicoes, handkerchiefs like those of Madras, flannels, and other woven fabrics: there are several tan-yards, and two establishments for sawing marble. Considerable trade is carried on in wool, iron, wood, and seed. There is a large weekly linen market, and five yearly fairs. In the neighbourhood, which is agreeable and fertile, there are potteries, lime-kilns, iron-works, and a marble quarry. The town has two hospitals, a high school, a public library, and a nunnery, according to the rule of La Trappe.

Laval was taken by the Vendeans in 1793. It was the country of Ambroise Paré, father of surgery in France.

LAVA'NDULA SPICA, native of the south of Europe, of which there are two varieties, if not distinct species, termed L. latifolia and L. angustifolia. The former is also called spike lavender, or simply *spike*, and the oil which it yields differs considerably from the oil of L. angustifolia, or L. vera, and is termed oil of spike or foreign oil of lavender. This sort is much less fragrant, of a deeper green colour than the oil of the true lavender, and is merely used in painting, or to adulterate the genuine oil, which is so extensively employed in the preparation of perfumes.

The flowers of the L. angustifolia are the parts employed in medicine. They should be collected before they are expanded, as they are then possessed of a more powerful aromatic odour and a hot bitterish taste. By distillation they yield an oil, which is yellowish, but by rectification becomes nearly white. It has the agreeable strong odour of lavender, and a burning bitterish taste. It is very limpid, but becomes thicker by time. The specific gravity is variable; that of the rectified oil is about 0·872. The freshly-rectified oil of lavender acts on litmus paper, reddening it more powerfully than when a year old. In the cold it deposits a lavender-camphor, or stearopten. It is often adulterated by oil of turpentine and oil of spike. The oil dropped on sugar relieves slight spasms of the stomach; when diffused by alcohol in water it constitutes the spirits of lavender. The compound tincture of lavender is useful in similar cases, and is the best means of covering the disagreeable taste of aloes.

LAVA'TER, JOHN CASPAR, was born in 1741 at Zürich, where his father was a physician. The severity of his mother oppressed his youthful mind, and in his juvenile days he was remarkable for a fantastic solitary disposition, and an aversion to school. He soon discovered a decided tendency to religion, and in early years he had a great predilection for singing hymns and reading the Bible. He made no great progress in philological studies, but had an aptitude at expressing his thoughts and feelings which admirably qualified him for the office of clergyman. In 1763 he travelled through Leipzig and Berlin in the company of Fuseli, and to Barth in Swedish Pomerania to study theology under the celebrated Spalding. In 1764 he returned to his native town, and occupied himself with his duties as a preacher, biblical studies, and poetical composition. The poems of Klopstock and Bodmer had produced an effect on his mind, and in 1767 he published his admired 'Swiss Songs,' and in the following year his 'Aussichten in die Ewigkeit' ('Prospects of Eternity'). In 1769 he was made deacon of the Orphan-house church at Zürich, where the extraordinary effect of his sermons, his immaculate life, and benevolent disposition made him the idol of his congregation, while his printed sermons sent forth his fame to distant parts. His 'Physiognomic Fragments' appeared in 1775, in 4 vols. 4to., a work which has since been translated, abridged, and illustrated in every variety of form. In early life he had become acquainted with men of various characters, and had observed corresponding points of resemblance in the character of their mind and their features; and as he had a disposition to generalize particular observations as much as possible, he endeavoured to raise physiognomy to the rank of a science. He collected likenesses from all parts, made *silhouettes* of his friends, and the result of this pursuit was the celebrated work above mentioned. It is said that in after-life Lavater had less faith in physiognomy than at first. He always firmly clung to his peculiar religious views, which were a mixture of new interpretations with antient orthodoxy, of philosophical enlightenment with extreme superstition. One leading article of his faith was a belief in the sensible manifestation of supernatural powers. His disposition to give credence to the miraculous led him to believe the strange pretensions of many individuals, such as the power to exorcise devils, to perform cures by animal magnetism, &c. Some even suspected him of Catholicism. It is singular enough that while his mystical tendency rendered him an object of ridicule to the party called the *enlightened* (Aufgeklärte), the favour he showed to many new institutions offended some religionists of the old school, who regarded any innovation in the received plans of education with horror. The extent of the prejudices of this last-named class may be gathered from Jung Stilling's life, where the author says that in some German towns the writer of any romance or any song, not being a hymn, was esteemed a free-thinker, and that even his (Stilling's) own religious works, from their being composed in a romance form, gained him that character. However, many of the religious world, even of those not immediately belonging to his congregation, regarded Lavater with great veneration, and, opening a correspondence with him, looked to his letters as the great source of their spiritual consolation. In

the latter years of Lavater his writings were less esteemed; his poems were compared with those of more recent German writers, and lost by the comparison; while a free-thinking spirit was on the increase, which checked all sympathy with his warm religious feelings. The lonely position of the old pious and superstitious believers in Germany, at a time when the free-thinking spirit that preceded the French Revolution made constant innovations on all they held sacred, is pathetically described in the last part of Stilling's 'Life.' The beginning of the Revolution Lavater regarded with pleasure; but his love changed to horror after the decapitation of the king. On the appearance of the Revolution in Switzerland, he mounted the pulpit with the greatest zeal, and there, as well as in all public assemblies, declaimed against the French party with an excess of animation and courage. When, on the 26th September, 1799, Massena took Zürich, Lavater, who was busied in the streets exciting the soldiery and aiding the sufferers, was shot by a grenadier. It is said that this grenadier was not one of the enemy, and that the act was that of an assassin; and it is further supposed that Lavater knew the man, but from a Christian spirit of forgiveness never betrayed him. He suffered a long time from this wound, but did not die till the beginning of 1801. During his illness he wrote some papers on the times and some poems, which are considered to be among his best productions.

LAVAUR. [TARN.]

LAVENDER, the name of hoary, narrow-leaved, fragrant bushes, inhabiting the south of Europe, the Canaries, Barbary, Egypt, Persia, and the west of India, with generally blue flowers, arranged in close terminal simple or branched spikes. Twelve species are described, of which two only are of general interest, namely, the common Lavender (*Lavandulavera*) and French Lavender (*L. spica*), both natives of sterile hills in the south of Europe and Barbary. The former yields the fragrant *oil of lavender*, so extensively employed in perfumery; and the latter *oil of spike*, employed by painters on porcelain, and in the preparation of varnishes for artists.

LAVER, a substance sometimes used as food, consists of the fronds of marine plants belonging to the genera Porphyra and Ulva. Common purple laver is furnished by Porphyra laciniata and vulgaris, two species common on rocks and stones in the sea on many parts of the British coast. They derive their botanical name from their beautiful purple or violet colour, which is produced entirely by the multitudes of spores, arranged in twos, threes, or fours, with which the whole frond is filled. Green laver is the Ulva latissima, a very common plant in the sea on rocks and stones, not only in Great Britain, but also on the coasts of India, New Holland, the Cape of Good Hope, and South America. According to Lightfoot the Scottish Islanders ascribe to it anodyne properties, and bind it about the temples to assuage the pain of headache in fevers, and to procure sleep.

In the Western Isles of Scotland, we are informed by the same authority, the inhabitants gather it in the month of March; and after pounding and stewing it with a little water, eat it with pepper, vinegar, and butter; others stew it with leeks and onions. In England laver is usually stewed and rendered palatable with lemon-juice; to many persons it is however nauseous, and it has been suggested that its introduction to fashionable tables was the sly contrivance of some medical practitioner who wished to prescribe it for the benefit of his scrofulous patients. (Greville's *Algæ Britannicæ*, p. 169.)

LAVOISIER, ANTOINE LAURENT. This distinguished and truly eminent chemical philosopher was born at Paris on the 16th August, 1743. His father, who was opulent, spared no expense in his education, in which he acquired at the College Mazarin a profound knowledge of astronomy, mathematics, botany, and chemistry.

After some hesitation as to what particular science he should more particularly dedicate himself, he was determined in the choice of chemistry by the brilliant discoveries with which Dr. Black and others had then recently enriched that science. When only twenty-one years of age he obtained the prize offered by the government for the best essay on lighting the streets of Paris; and it is stated, that in order to enable himself to judge of the intensity of the light afforded by lamps, he kept himself during six weeks in a room from which the light of day was entirely excluded.

In 1768 he was admitted an associate of the French Academy, and finding that he incurred considerable expense in the prosecution of his chemical researches, he asked, and in 1769 obtained, the appointment of one of the farmers-general of the revenue, and his purse and his laboratory were equally open to the young inquirers in science. He was afterwards appointed to superintend the numerous saltpetre-works of France.

During the reign of terror he was accused of having, as a farmer-general, mixed water and noxious ingredients with tobacco: to avoid arrest he secreted himself for some days; but hearing that his colleagues, and among them his father-in-law, were imprisoned, he voluntarily surrendered himself, and was condemned to death. In answer to a request for a respite of some days, in order to finish some experiments with which he had been recently engaged, and which he stated were of importance to the interests of mankind, he was coldly informed by the public accuser that the republic had no need of chemists, and that the course of justice could not be delayed. Deeply regretted by every man of science and by the numerous friends whom his amiable manners had attached to him, he was consigned to the guillotine on the 8th May, 1794, leaving a widow, who many years afterwards was married to Count Rumford.

His publications were numerous and highly important; for besides the larger works which we shall presently mention, he was the author of nearly sixty memoirs printed in the 'Memoirs' of the Academy, and other periodicals. His principal separate works are: 'Opuscules Chimiques et Physiques,' 2 vols. 8vo., 1775; 'Traité Elementaire de Chimie,' 2 vols. 8vo., 1789; 'Instructions sur les Nitrières, et sur la Fabrication de Salpêtre,' 8vo., 1777.

In a posthumous and incomplete publication, consisting of two octavo volumes, entitled 'Mémoires de Chimie,' Lavoisier, alluding to the term commonly employed of the *French theory*, claims it entirely and exclusively as his own; and although it will be impossible for us to enter minutely into a consideration of the Lavoisieran or antiphlogistic theory, yet we shall state, from his 'Elemens de Chimie,' his peculiar views on some important subjects, and one of the first of these is the nature of heat. Having mentioned its expansive and repulsive powers, he says that 'it is difficult to comprehend these phenomena without admitting them as the effects of a real and material substance, or very subtile fluid, which insinuating itself between the particles of bodies separates them from each other.' He admits that the doctrine is hypothetical, but asserts that it explains the phenomena of nature in a satisfactory manner, and that considering it as the cause of heat, or the sensation of warmth, he at first gave it the name of *igneous fluid* and *matter of heat*, but afterwards, in a work on chemical nomenclature by himself, Morveau, and Berthollet, he adds, 'We have distinguished the cause of heat, or that exquisitely elastic fluid which produces it, by the term of caloric, without being obliged to suppose it to be a real substance, but as the repulsive cause which separates the particles of matter from each other.' *Free* caloric he defines to be that which is not united in any way with any other body; *combined* caloric is that which is fixed in bodies by affinity or elective attraction, so as to form part of the substance of the body; and by *specific* caloric of bodies he understands the respective quantities of caloric requisite for raising a number of bodies of the same weight to an equal temperature, and the proportional quantity depends on the *capacity* of bodies for caloric.

His analysis of atmospheric air and the re-combination of its elements, though not quite correct, was nevertheless ably conceived and executed. He heated some mercury in a mattrass connected with a glass receiver with about 50 cubic inches of atmospheric air; he then found that a portion of the mercury was converted into small red particles, which did not increase after the heat had been continued for twelve days; and he then observed that only about 42 of the 50 cubic inches of atmospheric air remained unabsorbed, and this he found was no longer fit for respiration or combustion. On submitting the red particles of mercury to heat, they were separated into mercury and about 8 inches of gas, which eminently supported both respiration and combustion; and having several times repeated the experiment, he mixed the residual unabsorbed portion of the air with that which was obtained by heating the red particles of mercury, and he found that air was reproduced precisely

similar to that of the atmosphere, and possessing nearly the same power of supporting respiration and combustion.

Lavoisier admits that the experiment does not show the exact quantity of the two airs which constitute the atmosphere, for he states that the mercury will not separate the whole of the respirable portion, and consequently part of it remains 'united to the mephitis.'

Lavoisier also mentions some experiments which he performed with this highly respirable air thus obtained by the intervention of mercury from the atmosphere, and he notices the brilliant effects of the combustion of charcoal and phosphorus, and adds, 'This species of air was discovered almost at the same time by Dr. Priestley, M. Scheele, and myself. Dr. Priestley gave it the name of *dephlogisticated air;* M. Scheele called it *empyreal air;* I at first named it *highly respirable air,* to which has since been substituted the term of *vital air.*'

It is greatly to be regretted that so eminent a philosopher should so far have forgotten what was due both to others and himself as to have made such a statement as this. It was one of the last acts of Dr. Priestley to publish, however unwillingly, that he first stated to Lavoisier himself, at his own table in Paris, in the year 1774, the fact of his having discovered this gas, in the presence of persons whom he names. Nor indeed is this the only instance, to use a gentle expression, in which Lavoisier exhibited a want of candour unworthy, not merely of a philosopher, but of a man. (See the *Doctrine of Phlogiston established,* by Dr. Priestley, Northumberland, 1800.)

In 1778 he published a paper in the Memoirs of the Academy, entitled 'General Considerations on the Nature of Acids, and on the principles of which they are composed.' In this paper it is attempted to be proved that all acids owe their properties to the presence of oxygen, and that when bodies were deprived of oxygen they lost their acidity. This doctrine of the universal acidifying power of oxygen was generally adopted until Davy proved that what had been called oxymuriatic acid had not been decomposed, and that with hydrogen it formed muriatic acid; he first however distinctly proved that certain bodies, such as carbon and sulphur, were actually converted into acids by the union with oxygen; but by a too hasty generalization he was led to adopt principles which the further progress of science has proved to be untrue.

It is to be observed that Lavoisier did not discover any one of the elementary gaseous fluids. Mr. Cavendish had clearly described the properties of hydrogen before he began his career; and oxygen, azote, and chlorine were discovered, the two first in Britain and the last in Sweden, after Lavoisier commenced his chemical researches. In one particular case he indeed denies the existence of a well known fact, namely, that gunpowder can be fired in vacuo, but then the fact is irreconcilable with his theory.

The inquiries of Lavoisier had the principal share in introducing that reform in the nomenclature of chemistry which ended in the expulsion of the phlogistic theory; and it is correctly stated by Professor Brande, 'that in this reform Lavoisier took the lead, and though his original investigations connected with it are few and comparatively unimportant, he availed himself with so much skill of the labours of others, by placing them in new points of view and exhibiting their unexpected applications, as to render them almost his own. Lavoisier's character has, in some measure, suffered by the misguided zeal of his admiring commentators, who, not satisfied with allowing him due merit for the logical precision and sagacity of induction which he brought into chemistry, have represented him as having the experimental activity of Priestley and the laborious diligence of Scheele. But Lavoisier, though a great architect in the science, laboured but little in the quarry; his materials were chiefly shaped to his hand, and his skill was displayed in their arrangement and combination.'

LAVO'RO, TERRA DI, a denomination meaning 'a tract of good arable land,' is the modern name of a province of the kingdom of Naples, corresponding to the greater part of the antient Campania Felix. [CAMPANIA.] It is bounded on the north by Abruzzo, on the east by the province now called Sannio and formerly Contado di Molise, on the south by the province of Naples, on the west by the Mediterranean, and on the north-west by the Campagna di Roma in the Papal State. The boundary-line between the two states runs nearly parallel to, and at a short distance from, and sometimes on the right and sometimes on the left bank of the Upper Liris, beginning above Sora, which is near the northern extremity of Terra di Lavoro, at the foot of the Apennines of Abruzzo, down to the confluence of the Sacco with the Liris below the Papal frontier town of Ceprano. From that point the boundary-line diverges from the Liris to the westward, and follows a mountainous ridge which forms part of the chain of the Mounts Lepini, separating the basin of the Liris from that of the Pomptine Marshes, and terminating abruptly on the coast at Terracina. Two roads lead from the Papal State into the province of Terra di Lavoro; one by Terracina between the mountains and the sea-shore, and the other by the valley of the Sacco, which opens into the valley of the Liris at Ceprano. This last road, which follows the track of the antient Via Latina, has been comparatively neglected, although it offers the shortest and pleasantest communication between Rome and Naples, until 1831, when the present king of the Two Sicilies, Ferdinand II., restored the carriage-road from San Germano to Ceprano by way of Arce, and built a bridge over the Melfa, a mountain-stream which is an affluent of the Liris.

The province of Terra di Lavoro spreads in a semicircular shape between the lower ridge of the Apennine chain, which divides it from the inland provinces of the kingdom, the shores of the Mediterranean sea, and the volcanic group of mountains which encircle the bay of Naples, and which are included in the metropolitan province. Terra di Lavoro is divided into five districts, namely. 1. Nola, to the south-east, which embraces the fertile plain between the group of Mount Vesuvius and the Apennine ridge, which bounds on the south the valley of Avellino and Benevento. [AVELLINO.] The plain of Nola looks like an immense grove of tall elms and poplars planted in rows to support the vines which grow at their feet, and which twist around them, and hang in festoons from tree to tree. Between the lines corn and pulse are sown without fallows; but in order to prevent the ground from becoming exhausted, early crops of lupines and beans are raised, which are hoed up before they bear fruit, and are buried for manure. The soil is a rich sandy loam. 2. West of Nola is the district of Caserta, which includes the central part of Campania, and is watered by the Volturno. The plains of Caserta and Capua near the mountains are tolerably healthy, well cultivated, and extremely productive; but the lower plain of the Volturno, from Capua to the sea, is very unhealthy: it is chiefly occupied by herds of horned cattle. The stream Sapone, which rises in the hills above Teano and spreads into the plain below north-west of the Volturno, forming pools of stagnant water, contributes to poison the atmosphere of this region. A range of hills, the Massicus of the antients, here divides the basin of the Volturno from that of the Liris or Garigliano. 3. West of the above range begins the district of Gaëta, which includes the lower valley of the Liris and the plain of Fondi, which is separated from the Liris by the mountains of Itri, or Formian Mount. The low lands of the Garigliano are as unhealthy and desolate as those of the Volturno; but where the Formian Hills stretch near the coast the country is healthy, fruitful, and well cultivated. The plain of Fondi is very unhealthy, owing to a stagnant lake near that town. 4. North of Capua and beyond the defiles of Mount Tifate, the district of Piedimonte occupies the valley of the Upper Volturno to beyond Venafro, and as far as the great chain of the Apennines of Abruzzo. This part of the country is healthier, the low lands are cultivated with wheat and maize, and the lower slopes of the mountains are planted with olive trees, while the higher grounds afford pasture or are covered with chestnut trees. 5. North-west of the district of Piedimonte, and divided by it from an offset of the Apennines, lies the district of Sora, which embraces the valley of the Upper Liris. This is in great measure a mountainous district, cold in winter, different in character from the rest of the province, and partaking of the nature and climate of Abruzzo. The people are healthy and industrious, and fairer complexions, especially among the women, are to be found in this district than in the maritime parts of the country. Keppel Craven, in his 'Excursions into the Abruzzi,' 2 vols. 8vo., London, 1837 has given the latest account of the inland districts of Terra di Lavoro.

The population of the five districts is as follows:—Nola, 117,500 inhabitants; Caserta, 193,000; Piedimonte, 86,000; Gaëta, 102,650; Sora, 102,800. The population is essentially agricultural; and by the last census there were 135,546 men employed in agriculture, who, with their families, might be reckoned to constitute about three-

fourths of the population. There were also 7692 shepherds, and only 500 seamen. The clergy consisted of 3470 priests and 825 monks: there were also 1732 nuns. Good silks are made in the royal manufactory of Santo Leucio, near Caserta; cottons and woollens at Piedimonte; common woollen cloth at Arpino; and there are extensive tanneries at Santa Maria di Capua.

The principal towns of the province of Terra di Lavoro are:—1. Caserta, which is the residence of the intendente, or governor of the province, and of the civil and criminal courts, has 12,000 inhabitants, and is remarkable for the adjoining palace and gardens, which form one of the most magnificent royal residences in Europe. The two principal fronts of the palace are 787 feet in length, and contain four stories of 37 windows each; the two other sides are 616 feet long, and consist also of four stories of 27 windows. In the interior are four courts, and in the centre of the palace is a superb staircase, crowned by a circular hall, affording communication with the various sets of apartments. The richest marbles are displayed in profusion, most of them being from the quarries of the kingdom. Swinburne, in his 'Travels,' gives a list of them, amounting to 21 different sorts. The chapel is cased with pannels of yellow marble and adorned with paintings. The theatre is a masterpiece of art; antique columns of alabaster support the roof and divide the house into forty-six boxes, richly decorated. The gardens are adorned with an artificial cascade, the water of which is brought by an aqueduct from the neighbouring mountains. 2. Nola, a very old town and a bishop's see, with 9000 inhabitants, contains several churches and convents, and extensive barracks. A quantity of pottery has been dug up in the neighbourhood, resembling the Etruscan vases, and known by the name of Nolan or Campanian vases. 3. Maddaloni, a pretty town at the foot of the mountains, has a royal college and 10,000 inhabitants. 4. CAPUA, on the Volturno. 5. Santa Maria di Capua has 9000 inhabitants, and a considerable inland trade. In the immediate neighbourhood are the remains of the amphitheatre of antient Capua, which stood near the present site of Santa Maria. 6. Between Capua and Naples is the pretty town of Aversa. North of Capua are:—7. The modern town of Piedimonte, which is near the site of the antient Allifæ, and is well built; the inhabitants, who amount to 10,000, have an appearance of industry and comfort above their neighbours. 8. Venafro, on the high road to Abruzzo, in a country abounding with olives, has 3000 inhabitants. 9. Cajazzo, with 5000 inhabitants. 10. San Germano, a modern town with 5000 inhabitants, and a secondary or grammar school, is situated on the road leading to Rome by the valley of the Sacco, and near an important frontier pass between the two states. The monastery of Monte Casino is on a steep hill above San Germano. 11. Sora, higher up the Liris, at the foot of the Apennines, is a bishop's see, and has several churches and 7000 inhabitants. 12. Isola di Sora, in an island of the Liris, which forms a fine cascade above it, has 3000 inhabitants, and paper, iron, wire, and cloth manufactories. 13. ARPINO. 14. AQUINO. 15. Atina, among the mountains, in a healthy situation, has 8000 inhabitants and many antiquities. Its women are celebrated for their beauty. 16. Sessa (Suessa Aurunca), on a hill not far from the high road to Rome, has 4000 inhabitants, several churches and convents, and some remains of antiquity. 17. Teano, once the capital of the Sidicini, has now 4000 inhabitants, a cathedral, and seminary. A few miles south of Teano is Calvi, the antient Cales, now deserted on account of the bad air. Farther west the high road to Rome passes over a fine suspension bridge which has been lately thrown over the Garigliano, or Liris, by the present king Ferdinand II. Not far from this spot stood the antient Minturnæ. Beyond it is (18) GAETA. Next, passing through Itri, which is perched on a steep mountain, and is remarkable for its wretched appearance and the squalid look of its inhabitants, we reach (19) Fondi, a bishop's see and a frontier town, near the borders of the Papal State, in a fertile but unhealthy plain, with 5000 inhabitants, and some remains of antient walls, of the construction called Cyclopean. The antient Via Appia, with its old pavement, forms the principal street of the town.

In the valley of the Liris is the town of Pontecorvo, belonging to the Pope, with a small territory, surrounded on all sides by the Neapolitan province of Terra di Lavoro; it has a population of 6500 inhabitants.

The area of the province of Terra di Lavoro is reckoned at 2310 English square miles; and it contains thirty towns and 412 villages and hamlets. (Petroni, *Censimento dei Reali Dominj di quà dal Faro;* Neigebaur, *Gemälde Italiens;* Serristori, *Saggio Statistico;* Sir R. Colt Hoare; Keppel Craven, &c.)

LAW. In treating of the word *law* we will first explain its etymology, and the etymology of the equivalent words in the principal languages of the civilized world; we will next determine the strict and primary meaning of law, together with its various secondary meanings; we will afterwards state the most important species of law, in the strict sense of the word; and finally, we will make a few remarks on the origin and end of law.

1. *Etymology of Law, and the equivalent words in other languages.*—In the Greek language the most antient word for law is *thêmis* (θέμις, which contains the same root as τίθημι), meaning 'that which is established or laid down.' In Homer θέμις signifies a rule established by custom, as well as by a civil government: it also signifies a judicial decision or decree, a legal right, and a legal duty. (*Iliad*, i. 238; *Od.* xiv., 56; *Od.*, xvi., 403; *Il.*, xi. 770; *Il.*, ix. 156, 298; and see Passow in v.) θεσμὸς and τεθμὸς are two very antient Greek words, having the same origin and meaning as θέμις. The common Greek word for law, after the Homeric period, is νόμος, which first occurs in the 'Works and Days' of Hesiod (v. 274-386, Gaisford), and contains the same root as νέμω, to *allot* or *distribute*. The only word which the Greek language possessed to signify a *legal right* was δίκαιον, or δικαίωμα. (See Hugo, *Geschichte des Römischen Rechts*, p. 962, ed. xi.)

Jurisprudence was never cultivated as a science by the Greeks before the loss of their independence. Many causes concurred to prevent the Greeks from adding jurisprudence to the numerous subjects which they first subjected to a scientific treatment. The chief of these causes was perhaps the generally *arbitrary* character of the Greek tribunals, both in the democratic and oligarchical states. The Lacedæmonians had no written laws (see Aristotle's account of the jurisdiction of the Ephors in *Polit.*, ii. 9; compare Müller's *Dorians*, b. iii., ch. 6, s. 2; ch. 11, s. 2; and see Justinian's *Institutes*, lib. i., tit. 2, s. 10), and they were besides too great contemners of learning and science to cultivate law in a systematic manner. The Athenians possessed a considerable body of written laws, and, with their extraordinary talent both for speculation and action, they would probably have contributed something towards reducing law to a science, if the large numbers of the judges (δικασταί) in their courts had not led to a popular and rhetorical treatment of the questions which came before them, and, by diminishing the sense of personal responsibility, facilitated arbitrary decisions. (Xen., *Mem.* iv. 4, 4.)

For the first scientific cultivation of law the world is indebted to the Romans. 'How far our ancestors,' says Cicero, 'excelled other nations in wisdom, will be easily perceived on comparing our laws with the works of their Lycurgus, Draco, and Solon; for it is incredible how rude and almost ridiculous every system of law is, except that of Rome.' ('Incredibile est enim, quam sit omne jus civile, præter hoc nostrum, inconditum ac pœne ridiculum.' *De Orat.*, i. 44.) Apart from the general ability of the Romans in the business of civil and military government, the systematic cultivation of law in Rome is perhaps owing chiefly to the fact that the Roman tribunals were composed of a single judge, or magistratus. (Hugo, *Ibid.*, p. 345.) The persons filling the offices of *prætor urbanus* and *prætor peregrinus* (the magistrates who ultimately exercised the chief civil jurisdiction) were changed annually; and it was found convenient that every new prætor should, on his accession to his office, publish an authentic statement of the rules which he intended to observe in administering justice. In process of time these rules, known by the name of the *prætor's edict*, were handed down, with little alteration, from one prætor to another; and they furnished a text for the commentaries of the Roman lawyers, many of whose expository writings were drawn up in the form of treatises *ad edictum.*

The scientific cultivation of law among the Romans naturally led to the formation of a technical legal vocabulary in their language. The Latin is accordingly very rich in legal terms, many or most of which have been retained in the modern languages of western Europe, especially in those countries whose legal systems are founded on the Roman law. The only terms, however, with which we are at present concerned are those which denote the most general

notions belonging to the subject of jurisprudence. *Lex*, which has the same etymological relation to *lego* that *rex* has to *rego*, meant properly a measure proposed by a magistrate in the *comitia*, or assembly of the people. A *lex* was not necessarily a rule, and might relate to a special case (Hugo, *Ibid.*, p. 327); but as most of the *leges* proposed by the magistrates were general, the word came to signify a written law. *Jus* denoted law generally, whether written or unwritten; it also denoted a legal right or faculty. *Lex* signified '*a* law;' *jus* 'law' generally. (Austin's *Province of Jurisprudence*, p. 307.)

The Romance languages have retained the word *lex* in the Latin acceptation (*legge* Italian, *ley* Spanish, *loi* French). They have however lost the word *jus* (though they retain many of its derivatives), and have substituted for it words formed from the passive participle of *dirigo* (*diritto* Italian, *derecho* Spanish, *droit* French), probably after the analogy of the German *recht*.

Nearly all the Teutonic languages (including the Anglo-Saxon) possess some form of the word *recht*, with a double sense equivalent to the Latin *jus*, namely, *law* and *faculty*. The modern English uses *right* in the sense of *faculty* alone. The High German has *gesetz* (from *setzen*, 'to place,' like θεσμὸς and θέμις), for a written law equivalent to *lex*. The Low German languages have, instead of *gesetz*, a word formed from *legen*, to lay down, which in Anglo-Saxon is *laga* or *lag*, in modern English *law*. The word *law* however, in modern English, has not the limited sense of *gesetz*, but is coextensive with the Latin *jus*, when the latter does not signify *faculty*. We do not wish to dwell unnecessarily on these etymologies, but we will shortly notice that, besides *regt*, the Dutch language has the word *wet* in the sense of *law*. This word is derived from the antient *withan*, Gothic, 'to bind,' and is equivalent etymologically to the Latin *obligatio*. The English verb *to wed* is the same word. *Ehe*, which signifies *marriage* in modern German, originally meant *law* or *ordinance* (*Nibelungen Lied*, v. 139, 5061); so that the Dutch *wet* and the English *wed* stand to one another in the same relation as the antient and modern senses of *ehe*.

2. *Proper and improper Meanings of the word Law.*—A *law*, in the strict sense of the word, is a general command of an intelligent being to another intelligent being.* Laws established by the sovereign government of an independent civil society are styled *positive*, as existing by *positio*. [SOVEREIGNTY.] When law is spoken of simply and absolutely, *positive* law is always understood. Thus in such phrases as 'a lawyer,' 'a student of law,' 'legal,' 'legality,' 'legislation,' 'legislator,' &c., positive law is meant. Positive law is the subject-matter of the science of jurisprudence. [JURISPRUDENCE.] Every general command of a sovereign government to its subjects, however conveyed, falls under the head of positive laws. The general commands of God to man (whether revealed or unrevealed) are called the laws of God, or the Divine law: they are sometimes also known by the name of 'natural law,' or 'law of nature.' The Divine law (according to the phraseology just explained) is the standard to which all human laws ought to conform. On the mode of determining this standard some remarks will be made lower down.

Besides positive law, which is known to be a command enforced by a sanction†, and the Divine law, which is presumed to be so, there are some classes of laws which are not commands, though they bear an analogy, more or less remote, to laws properly so called. Thus by the term 'law of nations,' or 'international law,' are signified those maxims or rules which independent political societies observe, or ought to observe, in their conduct towards one another. An independent political society is a society which is not in the habit of rendering obedience to a political superior; consequently, an independent political society cannot receive a command or be subject to a law properly so called. But inasmuch as the maxims of international morality are general, and determine men's wills by the fear of provoking the hostility of other independent societies against their own country, there is a close analogy between the so-called 'law of nations' and positive law. We may here remark incidentally that the term 'jus gentium,' as used by the Roman lawyers (with whom it originated), has a totally different meaning from 'law of nations,' as used in modern times. According to their phraseology, *jus civile* consists of those rules of law which are peculiar to any independent state; *jus gentium* consists of those rules of law which are common to all nations. ('Quod quisque populus ipse sibi jus constituit, id ipsum civitatis est, vocaturque *jus civile*, quasi proprium jus ipsius civitatis. Quod vero natura vel ratio inter omnes homines constituit, id apud omnes peræque custoditur, vocaturque *jus gentium*, quasi quo jure omnes gentes utuntur.' *Inst.*, lib. i., t. 2, s. 1, and Gaius, i. 1.) In the language of the Roman jurists *jus naturale* is commonly equivalent to *jus gentium*. (See *e.g. Inst.*, lib. i., t. 2, s. 11.) Concerning a peculiar meaning attributed to *jus naturale* in a passage of Ulpian (*Dig.*, lib. i., tit. 1, fr. 1, s. 3; *Inst.*, lib. i., tit. 2, *ad. init.*), see the remarks of Mr. Austin, in his 'Province of Jurisprudence,' p. 108. Other classes of laws not imperative, but having as close an analogy to laws proper as the maxims composing international law, are the 'law of honour' and the 'law of fashion;' the laws of certain sports and games, such as the laws of the turf, the laws of whist, cricket, chess, &c., also stand in a similar predicament. The term *law* is also employed in certain cases where the analogy to laws properly so called is much more remote. Instances of this usage are such expressions as the 'laws of motion,' the 'law of attraction or gravitation,' the 'law of mortality' in a given country, the 'law of population,' the 'laws of human thought,' the 'law of a mathematical series.' In laws of this class (which may be styled 'metaphorical laws') there is no command and no intelligence to work upon; nothing more is signified than that there is a certain uniformity of phenomena, analogous to the uniformity of conduct produced in men by the operation of a law properly so called. [ANALOGY, p. 488.]

3. *Species of Positive Law.*—The positive laws of any country, considered as a system, may be divided with reference to their *sources* (or the modes by which they become laws) into *written* and *unwritten*. This division of laws is of great antiquity; the expression *unwritten laws* occurs in Xenophon's 'Memorabilia,' in a conversation attributed to Socrates (iv. 4, 19), in the 'Antigone' of Sophocles (v. 450-7, comp. *Aristot. Rhet.*, i. 13, 2), in the 'Republic and Laws of Plato' (v. 563 and 793, ed. Steph.), and in Demosthenes (*Aristocrat.*, p. 639, ed. Reisk.). In these passages it appears to signify those rules of law or morality which (being founded on obvious dictates of utility) are nearly common to all countries. Unwritten law, in this sense, nearly corresponds with the *jus naturale* of the Roman lawyers. In the language of the Digests and the Institutes, the terms *written* and *unwritten law* ('jus quod constat ex scripto aut ex non scripto') are used in a more precise manner, to signify those laws which had been promulgated by the Roman legislature in writing, and those rules of law which had been tacitly adopted by the same legislature from usage.* For (as it is stated in a passage of the Digests) 'since the laws derive their binding force from nothing but the decision of the people, it is fitting that those rules which the people have approved of without reducing them into writing should be equally obligatory. For what difference is there whether the people declares its will by vote, or by its conduct?' ('Quum ipsæ leges nulla alia ex causa nos teneant quam quod judicio populi receptæ sunt, merito et ea quæ sine scripto populus probavit, tenebunt omnes; nam quid interest, suffragio populus voluntatem suam declaret, an rebus ipsis et factis?' *Dig.*, lib. i., t. 3, fr. 32.)

Sir William Blackstone divides the law of England into 'the *lex non scripta*, the unwritten or common law, and the *lex scripta*, the written or statute law.' 'The *lex non scripta*, or unwritten law (he further says), includes not only general customs, or the common law properly so called, but also the particular customs of certain parts of the kingdom; and likewise those particular laws that are by custom observed only in certain courts and jurisdictions.' 'When I call these parts of our law *leges non scriptæ* (he proceeds to say), I would not be understood as if all those laws were at present merely *oral*, or communicated from the former ages to the present solely by word of mouth. It is true

* 'Lex nil aliud quam *regula imperans*,' says Bacon, *De Augm. Scient.* lib. viii., aph. 83. The word *regula*, or *rule*, is ambiguous: it sometimes signifies a *norma*, maxim, or canon simply; it sometimes signifies a *norma*, maxim, or canon, accompanied with a command. Moreover, it is a metaphor to say that the rule or *norma* itself commands. Bacon's definition would therefore be more precise if expressed as follows:—'Lex est norma summi imperantis.

† A sanction is the evil with which any one is visited in consequence of disobedience to a command.

* The distinction of law into written and unwritten does not seem to have been regularly made by the Roman jurists; for it does not occur in Gaius, from whose Commentaries the substance of the second title of the first book of the Institutes is borrowed. The distinction in question is introduced, both in the Digests and the Institutes with a reference to the Greek writers, doubtless philosophers.

indeed that, in the profound ignorance of letters which formerly overspread the whole Western world, all laws were entirely traditional, for this plain reason, because the nations among which they prevailed had little idea of writing. ...But with us, at present, the monuments and evidences of our legal customs are contained in the records of the several courts of justice, in books of reports and judicial decisions, and in treatises of learned sages of the profession, preserved and handed down to us from the times of highest antiquity. However, I therefore style these parts of our law *leges non scriptæ*, because their *original* institution and authority are not set down in writing.' (1 *Com.*, p. 63.) In this passage Blackstone clearly explains that unwritten law is so called, not because it does not exist in writing, but because it was not promulgated by the legislature in a written form. His statement of the sorts of laws severally comprehended by the classes of written and unwritten law in England is erroneous. Written law comprehends not only the statutes made by the parliament or supreme legislature, but also the written regulations issued by subordinate legislatures, as orders in council, and rules of court made by the judges. Unwritten law, moreover, comprehends not only the common law which is administered by the courts styled 'courts of common law,' but also the greatest part of the law styled 'equity,' which is administered by the courts styled 'courts of equity.'

Unwritten law has been called by Mr. Bentham *judge-made law;* a name which correctly denotes the mode by which it becomes law.

It may be remarked that a written law is called *a* law, but that a rule of unwritten law is never called *a* law. This phraseology corresponds to the distinction between *lex* and *jus*, and *gesetz* and *recht*, which was explained above.

Positive laws are also divided, according to their *source*, into laws made by *supreme*, and laws made by *subordinate* legislatures. In other words, laws may be issued by the sovereign legislature, or by functionaries deriving their authority from the sovereign legislature.

The *sources* of law are not unfrequently confounded with its *causes ;* in other words, with the facts which induce the sovereign to invest certain maxims with the legal sanction. Thus it is fancied that a rule of customary or consuetudinary law exists as law, by virtue of custom or usage, and not by virtue of the authority of the sovereign or his representative, who has imparted to it a binding force. This subject is clearly explained in Mr. Austin's 'Outline of a Course of Lectures on General Jurisprudence,' pp. 10, 11.

The laws of a state, considered as a system, may be divided, with reference to their *subject-matter*, into *public* and *private*. The division of *jus* into *jus publicum* and *jus privatum* originated with the Roman jurists, and occupies a conspicuous station at the beginning of the Digests and Institutes. No trace of this division exists, as far as we are aware, in any Greek author. *Jus publicum* is defined to be 'quod ad statum rei Romanæ spectat,' 'quod in sacris, in sacerdotibus, in magistratibus consistit.' *Jus privatum* is that 'quod ad singulorum utilitatem pertinet.' The institutional treatises of the Roman lawyers appear to have been confined to *jus privatum;* the Institutes of Justinian do not touch upon *jus publicum*, except in the final chapter *De Publicis Judiciis*, and this chapter is wanting in the Commentaries of Gaius, on which the Institutes of Justinian are mainly founded. Hence it appears that the Roman lawyers included under *jus publicum* not only the powers of the sovereign, and the rights and duties of persons in public conditions, but also criminal law. Their definition of *jus publicum*, however, does not properly include criminal law, and the term, as used by later writers, has not in general this extension. *Publicus* is the adjective of *populus*, and signifies that which belonged to the sovereign body of citizens; hence *jus publicum* signified that law which concerned the government of Rome, and its magistrates and other functionaries. *Privatus* seems to have meant originally that which was *separated* or *set apart* from any common stock; hence it came to signify that which did not concern directly the *public* or state.

The formal division of law into public and private is not to be found in the institutional treatises of English law. It is however used by Lord Bacon, in his treatise 'De Augmentis,' lib. viii., aph. 80; where he advises that, after the model of the Roman jurists, *jus publicum* should be excluded from institutional treatises.

Sir W. Blackstone, in the first book of his 'Commentaries,' treats of the rights and duties of persons, in their public and private relations to each other (pp. 146, 422). The former branch of this division, which occupies chapters 2 to 13, comprehends *jus publicum*, in its limited sense, which nearly corresponds to the English term 'constitutional law.' The *droit politique* or *constitutionnel* of Mr. Bentham, in his 'Traités de Legislation' (tom. i., p. 147, 325-6, ed. 1802), is also equivalent to *jus publicum*, in its strict sense. (Austin's *Outline*, p. lxvii.)

Positive law is further divided, with reference to its subject, into the *law of persons* and the *law of things*. The Roman jurists, who were the authors of this division, arranged these two classes under the head of *jus privatum*, together with a third, viz. the *law of actions*, or of judicial procedure. A full explanation of this important division is not consistent with the purpose of the present article: we extract a brief and lucid statement of it from Mr. Austin's 'Outline' already cited. 'There are certain rights and duties, with certain capacities and incapacities to take rights and incur duties, by which persons, as subjects of law, are variously determined to certain classes. The rights, duties, capacities, or incapacities, which determine a given person to any of these classes, constitute a *condition*, or *status*, which the person occupies, or with which the person is invested. The right, duties, capacities, and incapacities, whereof *conditions* or *status* are respectively constituted or composed, are the appropriate matter of the department of law which commonly is named the *law of persons : jus quod ad personas pertinet.* The department, then, of law which is styled the law of persons is conversant about *status* or *conditions :* or (expressing the same thing in another form) it is conversant about persons (meaning *men*) as bearing or invested with *persons* (meaning *status* or *conditions*). The department of law which is opposed to the law of persons is commonly named the *law of things: jus quod ad res pertinet.* The law of things is conversant about matter, which may be described briefly in the following manner: it is conversant about rights and duties, capacities and incapacities, in so far as they are *not* constituent or component parts of *status* or conditions. It is also conversant about persons, in so far as they are invested with, or in so far as they are subject to, the rights and duties, capacities and incapacities, with which it is occupied or concerned (pp. xvi., xvii.). The most important conditions or *status*, composing the law of persons, are *public* or *political*, and *private*. The former species includes all persons sharing the sovereign power and all public functionaries; the latter includes the conditions of husband and wife, parent and child, master and servant, guardian and ward, &c. The term *jus publicum*, when used in a precise sense, is equivalent to the former of these species. It may be remarked, that the erection of certain aggregates of rights and duties into a *status* is more or less arbitrary; and that the jurist must be guided by considerations of method and convenience, concerning which no very precise rules can be laid down. For example, in a country where a large sum of money was expended by the government in the relief of the poor, and where a large part of the working classes consisted of *paupers* (or persons receiving legal relief), it might be expedient to make the rights and duties of a pauper a condition, or *status*, in the law of persons. In a country where the legal relief of the poor was insignificant in amount, the rights and duties of a pauper would be more conveniently introduced in the law of things. Sir W. Blackstone, misled by the ambiguity of the Latin word *jus*, has rendered *jus personarum* and *jus rerum* by '*rights* of persons,' and '*rights* of things.' The origin of this portentous blunder is explained in Mr. Austin's 'Outline,' p. lxiii.

Positive law is also divided, with reference to the legal consequences of a breach of legal duty, into *civil* and *criminal*.

Civil law is that department of law in which every breach of a duty may be made the subject of a legal proceeding, for the purpose of conferring on the person wronged a right from the enjoyment of which he is excluded by the defendant, or of obtaining from the defendant compensation for a right violated by him. *Criminal law* is that department of law in which every breach of duty may be made the subject of a legal proceeding instituted by the sovereign or his representatives, for the purpose of inflicting punishment on the person charged with the breach of duty. The scope of a civil action is the redress of the plaintiff, by conferring on him the right, or

compensation for the violation of a right, which he claims from the defendant. The scope of a criminal action is to inflict punishment on the defendant for the breach of a legal duty which is imputed to him. *Penal* law is not identical with *criminal* law; for an act or omission may be liable to legal punishment in consequence of an action instituted by a *private person*. The action in English law termed a *qui tam* action is partly a civil and partly a penal, but is in no respect a criminal action. It has been already stated that the term *jus civile* originally signified the peculiar law of Rome. In modern times it has acquired, in many or most civilized countries, the limited sense which has just been explained. The term *crimen* was used by the Roman jurists as equivalent to *delictum publicum*, that is, a delict which was the subject of a *judicium publicum* (Hugo, *Ib.* pp. 368, 959). (On the contents of the French *code civil* see CODES, LES CINQ). *Civil* and *Criminal* delicts or injuries are terms which, in strictness, are unknown to the English law. A criminal proceeding is, in the language of the English law, styled a *plea of the crown*, as being a penal action instituted by the crown. The court recently created by statute in London is however styled the central *criminal* court. By the *civil law*, in England, is commonly understood the Roman law generally, or that portion of it which is received in the ecclesiastical courts.

Law is sometimes opposed to *equity*. *Equity*, in this sense, implies an arbitrary or discretionary power in the tribunal to decide, not according to prescribed rules of law, but according to its own conceptions of moral justice. In the language of the English law, *common law* is opposed to *equity*, concerning which opposition see EQUITY. *Common law* is so denominated as being founded on usages common to the whole nation, and not peculiar to a certain district. (1 Blackst. *Comm.*, p. 67-8.) In like manner, 'the Book of *Common* Prayer' is so designated in order to distinguish it from forms of prayer intended for *private* devotion. It may be remarked, that, in the language of the Roman law, *jus civile* is opposed to *jus prætorium* (the law made by the judicial legislation of the prætors), in the same manner that, in the language of the English law, *common law* is opposed to *equity*.

A *law* is likewise opposed to a *privilegium*. *Privilegium* is an antient term of the Roman law, inasmuch as it occurred in the Twelve Tables. (Cicero, *Leg.*, iii. 19.) It signified, according to its etymology, a measure directed at a single person (*hominem privum*), as distinguished from a law which applies to *classes* of persons; for, as it is stated in a fragment of Ulpian preserved in the Digests, 'jura non in singulas personas, sed generaliter constituuntur.' (Lib. 1, tit. 3, fr. 8.) The latter part of the word *privilegium* is connected with *lex*; but we have already stated that *lex* originally did not necessarily signify a rule. More properly, however, a *privilegium* signifies a special command of the sovereign, not founded on an existing general command or law. Such a *privilegium* may either be beneficial to the person or persons affected by it, as an exemption from all personal actions which the king of England can (or could) grant by his *writ of protection* (Blackst. 3 *Com.*, p. 289); or it may deprive him of some of his rights, or inflict some punishment upon him. The difference between a law and a *privilegium* is explained by Sir W. Blackstone as follows: 'Municipal (*i. e.* positive) law is a *rule;* not a transient sudden order from a superior to or concerning a particular person, but something permanent, uniform, and universal. Therefore a particular act of the legislature to confiscate the goods of Titius, or to attaint him of high treason, does not enter into the idea of a municipal law; for the operation of this act is spent upon Titius only, and has no relation to the community in general; it is rather a sentence than a law. But an act to declare the crime of which Titius is accused shall be deemed high treason; this has permanency, uniformity, and universality, and therefore is properly a rule' (or law). (1 *Com.*, p. 44.) The distinction here adverted to is that meant by the Greek writers when they speak of governments administered according to law, and governments administered not according to law. (See particularly Aristotle, *Polit.*, iv., 4, 5.) In the latter class of states, the acts of the government were a succession of *privilegia* (generally styled by the Greeks ψηφίσματα, although ψηφίσματα were often *laws*, strictly so called). Montesquieu's distinction between monarchy and despotism is founded upon the same principle. (*Esprit des Lois*, ii. 1.) Government by *privilegia* is properly called *arbitrary* government, the government being administered not according to rules, but according to the *arbitrium* of the sovereign one or many.

Concerning the difference between the making of laws and the execution of them, or (as they are termed) the *legislative* and *executive* functions of government, see LEGISLATION.

Law is sometimes opposed to *fact;* that is to say, the rule of law is distinguished from the facts or events to which it is applied in practice. In this sense it is said that every one is presumed to know the law; whereas ignorance of the fact is an excuse. (For the doctrines of the Roman law on this subject, see *Dig.*, lib. xxii., t. 6.) The distinction between law and fact is important in our system of jurisprudence, with reference to trial by jury; for, according to the theory of our law, the judge decides concerning the law, and the jury concerning the fact. This maxim is however little more than theory; for in practice the jury, by its power of returning a general verdict, is judge both of the law and the fact. [JURY.] On certain questions which necessarily arise in the administration of justice, and which are questions neither of law nor of fact (such as 'due diligence,' 'reasonable notice,' 'probable cause,' &c.) see an article in the *Law Magazine*, vol. xii., pp. 53-74.

Laws, considered singly, have been divided into numerous species, as declaratory, remedial, penal, repealing, &c. laws. Concerning these see Austin's *Province of Jurisprudence*, p. 22, and Dwarris *on Statutes*, ch. 10.

4. *Origin and End of Positive Law.*—It has been above stated that all positive laws are commands, direct or indirect, of the person or persons exercising supreme political power in an independent society. Consequently the notion that positive laws are derived from a compact between sovereign and subjects (styled the *original* or *social contract*) is a delusion.

The proper end of positive law is the promotion of the temporal happiness, or well being, of the community over which the law extends. Thus Aristotle, in his 'Politics,' says that 'political society was formed in order to enable men to live, and it continues to exist in order that they may live happily.' (I. 2.) 'Finis et scopus (says Lord Bacon) quem leges intueri atque ad quem jussiones et sanctiones suas dirigere debent, non alius est quam ut *cives feliciter degant.*' (*De Augm.*, lib. viii., aph. 5.) The meaning of Aristotle and Bacon, in the passages just cited, was no other than that expressed by Mr. Bentham in his well-known formula, that the end of political government is 'the greatest happiness of the greatest number.'

We have stated that the proper end of positive law is the promotion of the *temporal* happiness of the community. The end of the political union is the promotion of the happiness of its members in the present state of existence; that is to say, in the existence which is comprehended between birth and death. The promotion of men's happiness in the existence which commences after death is the end of the religious or ecclesiastical union. (See Warburton's *Divine Legation*, b. 1, s. 2, vol. i., p. 215, 8vo. ed.)

From the benevolence of the Deity, it is presumed that those rules which tend the most to produce the happiness of his creatures are most agreeable to him; and consequently the term 'Divine law' (also called natural law) is used to signify those maxims to which human laws ought to conform. In the vast countries where the Mohammedan and Brahminical religions prevail, a great proportion of the positive law is supposed to be derived from the direct revelation of a supernatural being; and therefore the Divine law and the positive laws of the state in great measure coincide. The Christian dispensation however does not (like the Jewish) contain any system of rules out of which a body of positive law can be formed, or which can be enforced by a civil government. Consequently, in Christian countries a very small part of positive law is founded upon precepts derived from immediate revelation: the far greater part of positive law is or ought to be fashioned upon rules of Divine law, which are only discoverable by a process of inference from the phenomena of human society.

LAW, JOHN, of Lauriston, was born about the year 1681 at Edinburgh, in which city his father exercised the trade of a goldsmith. His mother being heiress of an estate called Lauriston is the reason why, in conformity with the Scottish custom, Law is known by that name or title also. In very early life, in consequence of the reputation of possessing great talents, he was engaged to

arrange the revenue accounts of Scotland, an employment which may have mainly contributed to fix his mind upon financial schemes. About this time he proposed the establishment of a bank which should issue paper-money to the amount of the value of all the lands in the country, thus confounding credit or security with currency, and imagining that the latter could never be in excess so long as the property which the paper issues were supposed to represent should be in existence. Law lost his father when he was little more than of age. He was handsome in person and of graceful carriage, fond of society, and courted by it. Finding that his patrimony would not suffice for the supply of his extravagance, he had recourse to the gaming-table. During this career he fought a duel, and having killed his antagonist, he fled the country and visited Italy. His course of life must still have been very irregular, for it appears that he was banished successively from Venice and from Genoa, after which he wandered from one Italian city to another practising the arts of a gambler. Law next went to Paris, where he soon succeeded in ingratiating himself with the regent duke of Orleans, and in inoculating him with his plans of finance. By the persuasion of Law the first public bank of circulation was established by the regent in 1716, and its management was entrusted to the projector. This bank obtained the privilege for twenty years of issuing notes, which however were to be exchangeable on demand for coin of the established weight and fineness at the pleasure of the holder. The public debt of France at that time amounted to 1500 millions of livres, or about 70 millions sterling, and was so depreciated in the public estimation as to be unsaleable, except at 60 to 70 per cent. discount. Law's bank was projected with the view of paying off this debt, by giving the public creditor the option of subscribing for bank shares and paying for the same in the public stock at par. With the view of inducing the public to purchase the bank shares, a patent, giving possession of the country of the Mississippi, under the name of Louisiana, which had been granted in 1712, to the sieur Crozat, was purchased, and the Mississippi Company was formed, with a capital of 100 millions of livres, and allied to the bank, having secured to it for twenty-five years the sole right of trading to that quarter, and also of prosecuting the Canada beaver-trade. Still further to assist the scheme, the receivers-general of taxes were directed to make all their payments in the paper of the bank. With all these advantages it was yet a long time before the favour of the public was so far gained that the subscriptions amounted to 100 millions of livres. In 1718 the Mississippi Company had the entire farming or monopoly of tobacco granted to it for nine years, and thereupon sent great numbers of planters, artificers, and labourers to Louisiana. In the following year the French East India Company and the Senegal Company were both incorporated with the Mississippi Company, which then enjoyed the monopoly of the trade of France 'from the Cape of Good Hope eastwards to all the other parts of Africa; to Persia, India, China, Japan, and the Isles, even to the Straits of Magellan and Le Maire.' The prospect of advantages to be derived from these various sources soon began to operate upon the public; and such numbers crowded forward to make investments in the stock of the Mississippi Company, that in August, 1719, its price was driven up to 500 per cent. It may serve to show the feverish state of excitement then prevalent to state, that on the rumour of Law being seized with illness, the stock fell from 500 to 445 per cent., and that his convalescence raised it again to 610 per cent. In the month just named the general farm of all the public revenues was granted to the Company, all of whose privileges were by the same *arrêt* prolonged to the year 1770, in consideration of which concessions the Company agreed to advance to the government, for paying off the public debt, 1200 millions of livres, about 50 millions sterling, at 3 per cent. A further sum of 50 millions of livres was paid by the Company for the exclusive privilege of coining during nine years. In a few weeks the stock rose in price to 1200 per cent., when 150 millions of livres were added to the capital by fresh subscriptions at 1000 per cent., and, to take every advantage of the existing mania which had seized all classes, the new capital was divided into very small shares. By this means the Company was enabled to lend to the government an additional sum of 300 millions of livres at 3 per cent. In the midst of all this speculation, the bank having issued notes to the amount of 1000 millions of livres, upwards of 40 millions sterling, there was such an abundance of money afloat, that the prices of all commodities rose exorbitantly, and land was sold at fifty years' purchase. At this time Law was considered to be a man of so great consequence, that his levée was constantly crowded by persons of eminence from all parts of Europe, who flocked to Paris that they might partake of the golden shower. From November, 1719, to the following April, the price of Mississippi stock continued to rise, until it reached 2050 per cent. On the 21st of the following month a royal *arrêt* appeared, which suddenly produced an entire revulsion in the public feeling. Under the pretence of a previous depreciation of the value of the coin, it was by this arrêt declared necessary to reduce the nominal value of bank notes to one-half, and of the actions of the India or Mississippi Company from 9000 to 5000 livres. It is not possible adequately to describe the calamitious effects produced throughout France by this step. The bank notes could no longer be circulated at more than one-tenth of their nominal value; and the parliament having represented the fatal consequences of the *arrêt*, another was issued, stating that 'the king being informed that his reduction of bank bills has had an effect quite contrary to his intention, and has produced a general confusion in commerce; and being desirous to favour the circulation of the said bank bills for the conveniency of such as give or take them in payment, and having heard the report of the sieur Law, he has ordained that bank bills be current on the same footing as before the above *arrêt*, which he hereby revokes.'

The charm was however broken. This and ten other *arrêts* which were issued in the course of a month from its date could not restore the confidence of the public. Law found it prudent to retire from the management of the public finances, and for his personal protection a guard was assigned to him. Many prudent persons applied themselves earnestly to realise their property, and to send it for safety to other countries, which proceeding occasioned the issue of a royal *ordonnance*, in which such a course was forbidden upon pain of forfeiting double the value, while all investments in the stocks of foreign countries were prohibited on the like penalty. By these means the public alarm was carried to its height. The bank notes being generally refused in all transactions of business, an arrêt appeared forbidding any person to refuse them, under penalty of double their nominal value; and this occasioning a still greater run upon the bank, another arrêt was issued on the same day, ordering the bank 'to suspend the payment of its notes till further orders.'

By these proceedings many thousands of families, once wealthy, were suddenly reduced to indigence; and Law, who was the original concoctor, and had been the chief instrument in carrying out these vast financial delusions, was obliged to quit France with an inconsiderable fortune, the wreck of what he might at one time have realised; he resided for some time in different places in Germany, and settled at length at Venice, where he died in 1729.

In 'A Discourse upon Money and Trade,' which he wrote and published in Scotland, Law has left a record of the flattering but visionary views which led him to his financial schemes.

LAW, WILLIAM, born 1686, died 1761, the author of various works of practical divinity, of whom we should have known little, had it not happened that he was for some time living in the family of Mr. Gibbon, father of the historian Gibbon, which leads to the introduction of some valuable notices of his life, habits, and opinions, in the beautiful fragment of autobiography which the historian prepared. The piece is printed in Lord Sheffield's edition of 'The Miscellaneous Works of Edward Gibbon,' and to that work we refer for the details, giving here only a very slight outline.

He was born in Northamptonshire, went to Cambridge with a view of entering the Church; took the degrees of B.A. and M.A.; was of Emanuel College, and in 1711 elected a Fellow. On the accession of King George I. he refused to take the oaths prescribed by act of parliament, and in consequence vacated his fellowship. It was soon after this that he entered the family of Mr. Gibbon, who resided at Putney. Here he continued several years, and his connection with the family became perpetuated to his death in consequence of a design which Miss Hester Gibbon, the sister of the historian, formed, and executed, of retiring from the world in company with her friend Mrs. Elizabeth Hutche-

son, and living a life of charity and piety, with Mr. Law for their chaplain. They fixed upon King's Cliff, the place of Mr. Law's birth, as the spot to which they retired; and there Mr. Law lived the last twenty years of his life, dying April 9, 1761.

Mr. Law was the author of various works, in which he recommends the exercise of a piety which approaches to the character of ascetic, and which it is almost impossible for any one to practise who is not in a great degree relieved from the necessity of attention to the ordinary business of life. The most popular of them is entitled 'A Serious Call to a Devout and Holy Life,' a work containing many passages of great beauty, and many spirited sketches of various characters to be found in the world, which has had great influence on many minds, and might awaken a proper spirit of seriousness in all. Dr. Johnson said of this work, that it first led to his thinking in earnest of religion.

LAW, EDMUND, D.D., bishop of Carlisle, born 1703, died 1787. This amiable and learned prelate was the son of a clergyman in the northern part of Lancashire, and passed from the grammar-schools of that part of the kingdom to St. John's College, Cambridge. As soon as he had taken a degree he was elected Fellow of Christ's College, and in 1737 was presented by the university to the rectory of Graystock in Cumberland. To this, in 1743, was added the archdeaconry of Carlisle, which brought with it the living of Salkeld, on the pleasant banks of the Eden. In 1756 he resigned his archdeaconry and returned to Cambridge, having been elected master of St. Peter's College.

In this, the first period of Dr. Law's life, he had published those writings which show at once the peculiar turn of his own mind, and have given him a place among the best and wisest instructors of their species. His first work was his translation of Archbishop King's 'Essay on the Origin of Evil,' with copious notes, in which many of the difficult questions in metaphysical science are considered. This was soon followed by his 'Enquiry into the Ideas of Space and Time,' &c. Both these works were produced before he left Cambridge; but it was in his retirement at Salkeld that he prepared his 'Considerations on the Theory of Religion,' with 'Reflections on the Life and Character of Christ,' a work of singular beauty, not to be read by any person without edification and improvement.

To his Cambridge appointment of master of Peter House was soon added those of university librarian and professor of casuistry. He was made archdeacon of Stafford, had a prebend given him in the church of Lincoln, and, in 1767, one of the rich prebends in the church of Durham. The next year he was appointed to the bishopric of Carlisle.

In 1777 he published his edition of the works of Locke, with a life of the author.

The peculiar character of Dr. Law's mind appears to have been acquired in a great measure by a devoted study of the writings of that philosopher. From him he seems to have derived that value which he set on freedom of inquiry, in relation to theological as well as to every other subject, which led him to take part in the great controversy respecting subscription, and which he freely exercised himself. The most striking proof of this is afforded in the edition of his 'Considerations,' printed in the latter part of his life at a press at Carlisle, in which are many important alterations. From Locke also he seems to have derived his notions of the proper mode of studying the Sacred Scriptures in order to come at their true sense. He was in short an eminent master in that school of rational and liberal divines which flourished in England in the last century, and is adorned by the names of Jortin, Blackburne, Powell, Tyrwhitt, Watson, Paley, and many others.

This account of Dr. Law is derived for the most part from a notice of his life by Archdeacon Paley, inserted in Hutchinson's 'History of the County of Cumberland.'

He left a large family, of whom two of the sons became bishops, one being the present bishop of Bath and Wells, and another was the late Lord Ellenborough.

LAW-MERCHANT. [LEX MERCATORIA.]

LAWES, HENRY, a composer to whom English music is much more indebted than its two historians seem to have been inclined to admit, was a native most probably of Salisbury, of which cathedral his father was a vicar-choral, and was born in the year 1600, as appears from an inscription under his portrait, now in the episcopal palace of that city. He received his professional education under John Cooper, an Englishman, who having travelled and studied in Italy, thought fit to Italianize his names, and is generally mentioned as Giovanni Coperario. In 1625 Lawes was appointed one of the gentlemen of the chapel, and afterwards clerk of the cheque to Charles I. In 1633, in conjunction with Simon Ives, he produced the music to a mask presented at Whitehall by the members of the four inns of court, under the direction of such grave personages as Noy the attorney-general, Hyde, afterwards earl of Clarendon, Whitelocke, Selden, &c., and received one hundred pounds for his share in the business.* About the same time he composed the music to Milton's 'Comus,' which was performed at Ludlow Castle in 1634. He was well acquainted with the best poets of his time, and set many of their verses to music, particularly Waller's. He also lived much with persons of rank, whose poetical effusions were, in abundance of instances, made vocal by the notes of Lawes. These appear in the publications of his time, but chiefly in his three sets of 'Ayres and Dialogues for One, Two, and Three Voices,' published in 1653, 1655, and 1669, comprising about 150 songs, duets, and trios, printed in *lozenge* notes, in type of an indifferent kind, with no accompaniment but an unfigured base, and therefore not very appreciable in the present day, except by tolerably good harmonists, who to musical knowledge add some acquaintance with the style of our old music and its notation.

Lawes continued in the service of Charles till the king's death. He then had recourse to teaching, in which pursuit his time was much occupied, for his superior taste and ability, his good sense and gentlemanlike manners, occasioned his instructions to be eagerly sought after. At the Restoration he resumed his places in the chapel-royal, and composed the anthem for the coronation of Charles II. He died in 1662, and his remains were deposited in Westminster Abbey.

From the cold language in which Hawkins and Burney speak of Henry Lawes, and more especially from the disparaging expressions of the latter, we are much disposed to think that neither was acquainted with the best of his productions. The song in 'Comus,' 'Sweet Echo,' inserted by Hawkins, is a very poor specimen of his genius. Had either of those historians looked carefully into his three books of airs, &c., they could not but have found enough to convince them of his invention and judgment; enough to prove that the encomiums of contemporary poets, especially Milton, himself an expert musician, were sincere and deserved. How beautifully in 'Comus' does the great poet allude to his friend's compositions, where, speaking of him as 'The Attendant Spirit' (a character personated in the Mask by the composer himself), he says—

> 'Thyrsis? whose artful strains have oft delay'd
> The huddling brook to hear his madrigal,
> And sweeten'd every musk-rose of the dale.'

And in his thirteenth sonnet, addressed to Lawes, beginning—

> 'Harry, whose tuneful and well-measur'd song,'

he bears honourable testimony to the moral worth and judgment of the musician, which, he says, distinguished him 'from the throng.' The opinion of Waller is not less favourably and strongly expressed; and Herrick, in his 'Hesperides,' is almost enthusiastic in praise of the truly English composer—for it is a gross mistake to suppose that Lawes adopted the style of the Italian music fashionable in his time. In a preface to his first book he defends himself against the charge of imitation; and an impartial comparison of his best airs with those of his foreign contemporaries will not only prove him to be an original composer, but that the English in his time, and indeed long after, could boast a school of music peculiarly their own.

LAWES, WILLIAM, brother of the preceding, was educated under the same master, and for a time also held the situation of gentleman of the chapel. During the civil wars he entered the royalist army, and had the rank of captain; but with a view to his personal safety, lord Gerrard made him a commissary. Disdaining however the security offered, he was killed at the siege of Chester in 1645. The king was so much affected by his loss, that he expressed his sorrow in remarkably strong terms, and even went into mourning for his self-devoted servant.

William Lawes was an able musician; he composed much for voices and instruments, as well as many excellent part-songs, rounds, &c., which are to be found in the publica-

* Hawkins, iii. Langbaine however says that William Lawes was the coadjutor of Ives.

tions of the day. In Boyce's Collection is an anthem of his, which puts him on a level with most of the church composers of his time. But his chief work is a collection of Psalms for three voices, set to the well-known paraphrase by Sandys.

LAWN, a space of ground covered with grass, kept short by mowing, and generally situated in front of a house or mansion, or within the view from such. The number of evergreen exotics which survive our winters, and the verdure of the grass in summer, are peculiar features of England in comparison with continental Europe, where in general the grass is either burned up in summer, or the exotics are destroyed by the severity of winter. The management of a lawn is with us therefore a subject of interest to every possessor of a garden.

Previous to laying down, the ground intended for a lawn should be properly trenched and drained, in order that such trees and shrubs as may afterwards be planted upon it should succeed well. The direction of the trenches should be towards a drain, to which, if possible, their bottoms should form a regularly inclined plane, for the purpose of affording the means of escape for the water, which, in retentive soils more especially, would otherwise stagnate. Although trees and shrubs are absolutely necessary for giving due effect to the scenery of a lawn, yet in the latter, one open extensive space, lying in the full view from the windows of the house, must be preserved. For this portion, digging instead of trenching may be found sufficient; but the openings, which ought to command views from this principal area, should be trenched, as well as for the shrubs and trees; for if the operation were only performed with regard to the latter, the water would not find such free egress from the bottom as would be the case if the mode of trenching were adopted as is above recommended.

After trenching, the soil should be allowed to subside, and the greatest care should be taken to make the surface perfectly even, otherwise a great expense will be afterwards incurred by the loss of time in mowing, which can neither be so quickly nor so well performed where the surface is uneven.

If turf can be readily procured, a lawn is at once produced; and by such means a more uniform distribution of grass may be obtained than by any other means. The surface of a well-fed meadow, or of an old common, closely cropped by sheep and geese, affords the best kind of turf; and if any tall or coarse grasses should be mixed with it, no inconvenience will arise, for everything of this sort will eventually disappear under close mowing; and such only as are dwarf and suited to the soil will ultimately remain. Where a turf is to be produced by sowing, the seeds of such species as are indigenous to the locality, and possess at the same time the property of being dwarf and fine, are to be preferred; but in the event of this method of forming a lawn being adopted, it is always desirable that a narrow slip of good turf should be carried all round the circumference. The following species may be mentioned as proper for a lawn in average situations:—Lolium perenne, or rye-grass; Poa trivialis or pratensis; Anthoxanthum odoratum, or sweet vernal; Cynosurus cristatus, or crested dogstail, with a considerable quantity of Medicago lupulina, or black nonsuch, and Trifolium repens, or Dutch white clover. If the situation is particularly dry, Festuca ovina, or sheep's fescue, should be substituted for Lolium perenne; if very low and wet, then the place of the latter may be filled with Alopecurus pratensis, or meadow foxtail. All these grasses may be procured of dealers in agricultural seeds; it is however better for persons in the country to collect for themselves such as can be found in their neighbourhood, for then they can depend upon their being genuine. The utmost care should be taken to avoid the introduction of Dactylis glomerata, or cocksfoot grass, and Holcus lanatus, or mollis, for these hard, harsh, stubborn grasses resist the effects of mowing for a long time.

The process called inoculating, or of making lawn by sowing the ground with fragments of turf, and rolling them in, cannot be recommended when a lawn is required to look particularly well, for it is a long while before the surface of the ground becomes uniform under such circumstances.

Lawns, when once established, require only to be kept neat by the ordinary routine of rolling, mowing, and sweeping, except keeping the surface perfectly even, by making up small hollows, with screened mould, early in spring. When lawns become worn out, a top-dressing of any finely-divided manure will refresh them: malt-dust applied in October is excellent for this purpose; and at the same time an additional quantity of grass-seed may be sown. Where the walks are straight, the edges of the lawn adjoining them should be perfectly straight also, and care should be taken that the grass-edging is kept rolled down and pared, so as never to exceed an inch and a half above the level of the walk.

LAWRENCE, ST., River. [CANADA.]

LAWRENCE, SIR THOMAS, was born in April or May, 1769, at Bristol. His father had been brought up to the legal profession, which he however never followed. Having contracted what the world calls an improvident marriage with a beautiful and accomplished young lady, daughter of the Rev. W. Read, vicar of Tenbury, he obtained some years afterwards, through the interest of an aunt of Mrs. Lawrence, the office of supervisor of excise at Bristol, which he resigned soon after the birth of his son Thomas, and became landlord of the White Lion inn. Not succeeding at Bristol, Mr. Lawrence, in 1772, was enabled by his friends to become landlord of the Black Bear at Devizes, where he remained till 1779. This inn was at that time much frequented by the rich and fashionable, who resorted to Bath, and generally stopped at Devizes. It was here that young Lawrence manifested that decided predilection for the art in which he subsequently attained such eminence. He drew striking likenesses with the pencil and pen while a child in petticoats. He was likewise remarkable for the feeling and taste with which he recited poetry, in which he had been trained by his father, who never failed to introduce him to his guests, who were delighted both with his genius and his extraordinary personal beauty. It was in 1775, when he was only six years old, that Mr. (afterwards Lord) Kenyon and his lady had their portraits in profile taken by the infant artist. They were deficient in force, but the execution was extremely easy and spirited, and the likenesses accurate. Very soon after this event he was sent to a highly respectable school, kept by Mr. Jones, near Bristol, but he was removed when only eight years old; and this was all the regular education that he ever had. In 1779 Mr. Lawrence failed, and was obliged to leave Devizes, whence he went to Weymouth. In 1782 Mr. Lawrence settled at Bath, and placed his son for a time as a pupil under Mr. Hoare, a crayon painter, of exquisite taste, fancy, and feeling, from whom young Lawrence acquired that grace, elegance, and spirit, which qualified him to be so pre-eminently the painter of female beauty. At the age of thirteen he received from the Society of Arts the great silver pallet, gilt, with an additional present of five guineas, for a copy in crayons of the 'Transfiguration.' Sir Thomas frequently declared that this honour had given a great impulse to his enthusiastic love of the art. Nor did he confine himself to portraits. At the age of nine he copied historical pictures in a masterly style, and at the age of ten ventured on original compositions of the highest order, such as 'Christ reproving Peter for denying him,' 'Reuben requesting his Father to let Benjamin go to Egypt,' 'Haman and Mordecai,' &c. It was in 1787 that Lawrence's father resolved to bring his son to London, and took apartments in Leicester-square. He was soon introduced to Sir Joshua Reynolds, who gave him good advice and encouragement, and always received him with kindness. It was in the same year (1787) that he first exhibited at Somerset-House, where seven of his pictures, all female portraits, were admitted. From that time his fame and his practice rapidly increased, though he had some formidable competitors, one of whom was Hoppner, who was patronized by the Prince of Wales. In 1791 he was chosen associate of the Royal Academy. In 1792 George III. appointed him to succeed Sir Joshua as principal painter in ordinary, and the Dilettanti Society unanimously chose him for their painter. From that time forward every exhibition at Somerset-House offered fresh proofs of his talents. Yet these pictures were but a small portion of those which he executed.

We cannot dwell on particulars, but we must not pass over the honourable commission which he received from King George IV. (then Prince-Regent) to paint the portraits of the sovereigns and the illustrious warriors and statesmen who had been the means of restoring the peace of Europe. He commenced his labour in 1814 with portraits of the king of Prussia, Blücher, and Platoff, who were then in England. In April, 1815, the prince conferred the honour of knighthood upon him. In 1818 he proceeded to the congress

of Aix la-Chapelle, thence to Vienna, and in May, 1819, to Rome, where his magnificent portraits of Pope Pius and of Cardinal Gonsalvi were enthusiastically admired. The collection of portraits executed in obedience to this commission is now in the Waterloo Hall at Windsor Castle. 'Among so great a number of portraits,' says Dr. Waagen, 'all cannot be equal in merit. I was particularly pleased with those of the Pope, Cardinal Gonsalvi, and the emperor of Austria. Besides the graceful and unaffected design, the clear and brilliant colouring, which are peculiar to Lawrence, these are distinguished by greater truth of character and a more animated expression than is generally met with in his pictures.' The praise here given to Sir Thomas Lawrence is just, but it is not complete: he possessed the happy talent of idealizing his forms, without departing from nature or destroying the likeness. He evidently profited, as Mr. Howard observes, by the sound advice given him by Sir Joshua Reynolds, 'not so to imitate the old masters as to give a richness of hue rather than the ordinary hues of nature, but to paint what he saw;' but at the same time 'not to fall into the vulgar error of making things too like themselves.'

In speaking of the merits of Sir Thomas, his admirable portraits of beautiful children deserve especial mention, the engravings from some of which are universally known. Though Sir Thomas had in his childhood attempted historical compositions, which gave ample promise of future excellence, he was so absorbed by portraits, that he had no time to devote any adequate attention to historical painting. Some of his pictures of the Kemble family may indeed be almost considered as historical; and in 1797 he exhibited at Somerset-House a picture of Satan calling his Legions, after Milton, which he himself considered as one of his best works. But the opinions of critics and connoisseurs on the merits of this celebrated picture are so different, and even so diametrically opposed to each other, that it would be evidently unsafe to admit it as a proof of either his ability or inability to attain the dignity of history.

While Sir Thomas was absent on the Continent, Mr. West, the venerable president of the Academy, died in March, 1820, and Sir Thomas was chosen, without opposition, to succeed him. He returned in April, loaded with honours and presents which he had received abroad, to meet with equally flattering distinctions at home, which he continued to enjoy without interruption till his death, which took place at his house in Russell-square, on the 7th January, 1830, in the 61st year of his age.

Though Lawrence had no school education, he had acquired a vast fund of various and extensive knowledge: he was well acquainted with the literature not only of his own country, but of the rest of Europe. His addresses to the students of the Royal Academy were full of good advice, and delivered with a kindness of manner which proved his sincere wishes for their welfare and success. To the merits of his brother artists, whether dead or living, he was ever just, and no feeling of envy or jealousy seems ever to have ruffled the innate benevolence of his mind. It might have been expected that he could not fail to accumulate a large fortune; but as this was not the case, ever-busy calumny was ready to accuse him of gambling, a vice to which he was so far from being addicted, that he renounced billiards, in which he greatly excelled, because, as he said, 'Though I never played for money, my play attracted much attention, and occasioned many and often very high bets. Next to gambling itself is the vice of encouraging it in others; and as I could not check the betting, I have given up my amusement.' Very early drawbacks for the assistance of his family, a style of living at the outset perhaps rather too expensive, an utter carelessness of money, as he himself says, extensive assistance to artists less fortunate than himself, and, above all, the vast expense of procuring that unrivalled collection of drawings by the great masters which has been so unhappily dispersed since his death, are fully sufficient to account for his not growing rich.

Sir Thomas Lawrence was never married. It appears that he was once engaged to a beautiful and accomplished young lady, the daughter of Mrs. Siddons; but difficulties arose, and the lady died of a pulmonary complaint some years afterwards. Sir Thomas remained single; but many of the noblest efforts of his art perpetuate the resemblances of the several branches of the Kemble family, for which he always felt the strongest attachment and admiration. One of his very last performances was an exquisite portrait of Miss Fanny Kemble, of whose talents he expressed the highest opinion. He painted this picture with remarkable ardour, and spoke of it when finished as one of his most successful works.

LAWSO'NIA, a genus of plants of the natural family Lythrariæ, which, consisting of only one or two species, may be found in most Oriental regions in gardens or in field cultivation. The genus is characterized by having a four-partite calyx, four unguiculate petals, eight stamens, a sessile ovary, the capsule scarcely dehiscent, or rather forming a globular membranaceous four-celled berry, with several angular seeds in each cell. It is disputed among botanists whether this genus consists of one or of two species; in the latter case, one being armed with thorns, was called *L. spinosa*, and the other being without any, was named *L. inermis*, by Linnæus. De Candolle has followed Lamarck in uniting them together under the name *L. alba*, stating that when young the plant is unarmed, but when older becomes thorny from the hardening of the smaller branches. The author of this article has cultivated both for several years in India, and found they retained their characteristic differences when raised from seed and grown in the same place, and under similar circumstances. The natives of North India distinguished the unarmed species by the name *phoolke*, or flowering *mhendee*. It is a much smaller plant, but flowers most abundantly. The thorny species is called *mhendee*; this, besides being a larger plant, contains a greater proportion of colouring matter, and is extensively cultivated in the vicinity of Sidoura, near the north-west bank of the Jumna. The flowers of both are corymbose, white, and powerfully fragrant; the leaves smooth, opposite, oval, lanceolate. To the latter species or variety the Arabic name *hinna* or *henna* is more especially applied, which in many of their medical works, as in that of 'Serapion,' is described under that of *al hanna*, where it is interesting to observe he quotes the description by Dioscorides of *kupros* (κύπρος) as applicable to this plant. This *kupros*, or Cyprus, is moreover supposed to be the *copher* of Scripture. (*Cantic.*, i. 12.) Besides the similarity of name, no plant is more likely to have been alluded to in the above passage, as no other is more highly esteemed or more frequently employed than the hinna, and it would appear to have been applied to the same purposes from very remote antiquity. All Oriental travellers describe the use of this plant by Asiatic women in dyeing their nails and the tips of their fingers, as well as the soles of their feet, of an orange hue with the leaves of the hinna. It is also used by the men for dyeing their beards, the orange colour being afterwards converted to a deep black by the application of indigo. That this plant was similarly used from very early times is highly probable from the allusions to it by poets, as well as from some of the Egyptian mummies appearing as if the nails had been similarly dyed.

LAY-BROTHERS, pious but usually illiterate persons, who devoted themselves in some convent to the service of the religious. A lower class of these were *Oblati*, who devoted themselves to more menial servitude. There were also *Fratres ad succurrendum*, assistant brothers, who wore only a short scapulary, while the professed lay-brother had the habit of the order. The institution of lay-brothers of the professed kind began in the eleventh century. The Jesuits termed their lay-brethren *coadjutores*. (Fosbrooke's *British Monachism*, 4to edit., p. 265-269.)

LAYBACH. [ILLYRIA.]

LAYERING is an operation by which the propagation of plants is effected by laying down or bending the shoots, so that a portion of them can be covered with earth. A shoot so operated on is called a *layer*, and the point which furnishes the layers bears the name of *stool*. Some plants are so much disposed to emit roots that if their branches happen to come in contact with the earth they immediately begin to strike. But although it may be easily imagined that the observation of this common circumstance has led to the artificial practice, yet some additional operations besides that of merely bringing a shoot in contact with the earth are found necessary for many plants on which this mode of propagation is practiced. The principle by which the operation is rendered effectual for the object in view is the following:—When the shoot of a species not freely disposed to send forth roots has merely its bent part inserted in the earth, the woody matter organized by the leaves passes down to the roots nearly as usual; but if the communica-

tion along the alburnum is interrupted by an acute bend, twist, or incision, a *callus* will be formed, from which by degrees spongioles are emitted, and thus roots ultimately produced.

The part of the shoot intended to form a layer should be divested of leaves where it is to be covered with the mould, and a slit should be made on the bent part, or the branch should be twisted half round at the bend so as to disarrange the woody tissue, or the bark should be half or three-quarters *ringed:* the shoot is then fixed down by pegs or hooked sticks, cut down to within an inch or so of the ground, and covered with good mould, which must afterwards be kept tolerably moist. In general roots are emitted in a few weeks, and by the end of a season young plants are obtained quite fit for transplantation. Some plants however require to be left for two years *on the stools* before they are removed, and there are some which can hardly be made to root at all in this manner.

Plants so situated as to render it impossible to bend their branches to the ground may nevertheless be layered by having their shoots introduced into a pot or box of soil elevated to them, and supported in a convenient position. This is a common practice among the Chinese, who cause branches of trees to root in this manner by partially ringing them, and covering the parts so ringed with a ball of clay, which is kept moist.

LA'ZULITE, LAPIS LA'ZULI, occurs crystalline and massive. Primary form of the crystal a cube, but occurs in imbedded rhombic dodecahedrons. Cleavage parallel to the planes of the dodecahedron. Fracture uneven. Hardness 5·5 to 6. Colour azure and different shades of blue; streak, paler blue. Lustre vitreous. Translucent, opaque. Specific gravity 2·76 to 2·94.

Massive variety amorphous, sometimes in grains, imbedded. On charcoal fuses, when pure, into a white glass. It is brought from Persia and China, and is employed in the manufacture of Ultramarine.

Analysis by Gmelin.		By Fuchs.	
Silica	49·0	Phosphoric Acid	41·81
Alumina	11·0	Alumina	35·73
Lime	16·0	Magnesia	9·34
Soda and Potash	8·0	Silica	2·10
Oxide of Iron	4·0	Protoxide of Iron	2·64
Magnesia	2·0	Water	6·06
Sulphuric Acid	2·0		
			97·68
	92·0		

It seems improbable that so different results should be obtained from the same mineral. Dr. Thomson admits the presence of phosphoric acid; the analysis by Fuchs is therefore most probably the correct one.

LAZZARO'NI. [NAPLES.]

LAZZERETTO is the name given to certain buildings and enclosures which are annexed to seaport towns, chiefly in the Mediterranean, for the sake of keeping therein confined the crews of ships and passengers arriving from Turkey, or other places where the plague, or other disease deemed contagious, is known to prevail. The persons thus confined are said to be in quarantine, from the Italian word *quaranta*, 'forty,' because the period of confinement for those arriving from actually infected places is forty days, after which, if no one has fallen ill, they are set at liberty. A lazzeretto generally consists of various detached buildings with courts between, the whole surrounded by a wall, and placed in airy situations outside of the town, and on the sea-shore, and in some instances on a small island or rock near the coast. Besides the lodging-houses for persons in quarantine, there are large warehouses in which goods capable, or supposed to be capable, of communicating the disease, such as wool, cotton, leather, &c., are purified. This purification is effected by spreading them out in the air for a length of time, and stirring and turning them about, which is done by the 'guardiani,' or keepers of the establishment, who, it is supposed, if there were any infection, would speedily take it. These 'guardiani' are kept in strict quarantine, but are well paid for the confinement and risk. These establishments are kept under very strict regulations, any infringement of which is visited by severe penalties, amounting in some cases to death. The principal and best regulated lazzerettos are those of Venice, Leghorn, Marseilles, Trieste, Genoa, Messina, and Malta. The name 'lazzeretto' is derived from St. Lazarus, who, in the Roman calendar, is the patron of lepers, and as leprosy was a very common disease in Italy and other parts of Europe during the middle ages, the hospitals in which lepers were confined obtained the name of lazzeretto, and the lepers themselves were called lazzari, a word which has perpetuated itself in the lazzaroni, or lowest class of the inhabitants of Naples, because, as some believe, of their dress, which resembles that which was worn at one time by the lepers. Houses for lepers in England, were often called lazar-houses. John Howard wrote 'An Account of the principal Lazarettos in Europe,' 4to., 1789, republished in London, 4to., 1791. From this work it appears, that the lazzeretto of Venice was the earliest; and that the rules and tariffs of the other lazzerettos in Europe were copied from it. The health-office in that city, by which the lazzeretto is conducted, was instituted by a decree of the senate in 1448, during a time of pestilence.

LEA RIVER. [ESSEX; HERTFORDSHIRE.]

LEACH, WILLIAM ELFORD, was born at or near Plymouth in Devonshire in the year 1790. He was brought up to the medical profession, and graduated as a physician, but he devoted himself to the study of zoology, and attained, at an early age, a high reputation, both at home and abroad, as an original and scientific naturalist. In 1813 he was appointed one of the curators of the natural history department in the British Museum, which situation he held until 1821, when his career was cut short by the loss of his health and reason, probably brought on by too close an application to study. He retired into the country, and shortly afterwards went abroad, where he spent most of the remainder of his life, residing chiefly in Italy, attended by a devoted sister. After a long suspension of his studies, he in a great measure regained his mental faculties, and resumed his favourite occupations: the letters which he wrote to his scientific friends in England exhibit the same devotion to the study of nature which distinguished the brighter years of his life. He returned to his native country for a short time, but afterwards took up his abode again in Italy, where he died suddenly of cholera, on the 25th of August, 1836, at the age of 46.

Dr. Leach published many new genera and species in the different classes of vertebrated animals, particularly in birds, but it is in entomology and malacology that his labours are most known, and his improvements of the greatest importance. We are chiefly indebted to him for the first introduction into this country of a natural system of arrangement in conchology and entomology, and for the adoption of the general and scientific views of those subjects which originated with Cuvier and Latreille. Among his literary contributions he wrote several papers in the 'Linnæan Transactions,' on insects, and published a general arrangement of the classes Crustacea, Myriopoda, and Arachnides, in the same work, which was considered as the best classification of these animals before the work of Dr. Milne Edwards appeared. Dr. Leach was the author of a paper in the 'Philosophical Transactions,' on the genus Ocythoë, in which he endeavours to prove that it is a parasitical inhabitant of the argonaut, or paper nautilus shell: he also wrote 'Malacostraca podophthalma Britanniæ,' which was illustrated with beautiful plates: eight parts of it were published in London in 1815-16. He was the author of the 'Zoological Miscellany,' three volumes of which came out in London from 1814 to 1817; and he wrote several articles in Brewster's 'Encyclopædia' and the 'Dictionnaire des Sciences Naturelles.' His principal work, 'The Natural History of the Mollusca of Great Britain,' is in the possession of his friend Mr. Bell, and has not yet been published.

LEAD. The properties of this metal are, that it has a bluish-grey colour, and is of considerable brilliancy when fresh surfaces are formed by cutting; if it has not been cooled too rapidly, it is so soft, that even when in pieces of considerable thickness, it may be easily bent. It soils slightly, and leaves on paper or cloth a mark after friction resembling that of plumbago. Its specific gravity is 11·445, but when impure not greater than 11·352. Lead may be reduced to thin laminæ, but its tenacity is extremely slight; so that a wire about $\frac{1}{10}$th of an inch in diameter breaks with a weight of 30 pounds. It fuses at about 612°, and when slowly cooled crystallizes in octohedrons. It is not a volatile metal, for in close vessels it may be heated to whiteness without subliming. When exposed to the air it absorbs oxygen and carbonic acid slowly, and acquires a superficial coating of

carbonate of lead. In distilled water which has been freed from and kept from the contact of the air, it undergoes no change; but if it be exposed to air and water, it is oxidized and converted into carbonate of lead with considerable rapidity; this carbonate has the appearance of minute shining brilliant scales. The presence of saline matter in the water, even though air be present, very much retards the oxidation of the lead, and a very minute quantity of some salts even prevents this effect altogether. Thus phosphates, sulphates, chlorides, and iodides, owing to the compounds which are formed being difficultly soluble, are highly preservative; and so small a quantity as $\frac{1}{30000}$th part of the phosphate of soda or iodide of potassium in distilled water prevents the lead from being much corroded, the small deposit which is formed preventing the further corrosion of the metal. Though at common temperatures lead is slowly acted upon by the oxygen of the air, yet, as we shall presently more particularly mention, it is readily oxidized when the heat is raised.

ORES OF LEAD.—The ores of lead, strictly speaking, are few in number; indeed the only one which can properly be considered as a working ore is the sulphuret, but there are various combinations of lead occurring in nature, of which we shall give a brief account, after first mentioning

Native Lead.—This is of very rare occurrence, and in some cases of very questionable origin. It has been found in small masses in the lava of Madeira, and also in the neighbourhood of Alston in Cumberland; it is in small globular masses, imbedded in galena, or sulphuret of lead, and a sluggy substance, accompanied with blende and crystals of quartz.

Protoxide of Lead: Native Massicot.—This occurs in amorphous masses. Fracture earthy. Brittle. Specific gravity 8·0. Colour yellow. Opaque. Externally dull, internally of a semi-metallic lustre.

It melts readily by the blow-pipe, and, according to Dr. John, it consists of—

Protoxide of lead	87·382
Carbonic acid . .	3·846
Lime and oxide of iron	0·481
Silica (ferruginous) .	2·404
	94·113

Deutoxide of Lead: Native Red Lead; Native Minium.—Occurs amorphous and pulverulent; colour carmine red. Hardness 2·0 to 2·5. Specific gravity variously stated. Dull. By the blow-pipe on charcoal it is reduced to the metallic state. It is supposed to arise from the decomposition of sulphuret of lead and the oxidation of the metal. It occurs in Yorkshire, Suabia, Siberia, and some other places.

Chloride of Lead: Cotunnia; Cotunnite.—Occurs in small flat colourless crystals in Cornwall, and at Vesuvius in acicular crystals of an adamantine lustre inclining sometimes to pearly or silky. Specific gravity of the chloride from Vesuvius 1·897.

Fuses by the blow-pipe, is soluble in a large quantity of water, and, according to Berzelius, consists of—

Chlorine	25·48
Lead	74·52
	100·

Di-chloride of Lead: Berzelite.—Occurs in crystalline masses, with a fibrous and radiated structure, on earthy black ore of manganese. Hardness 2·5 to 3. Specific gravity 7·0 to 7·1. It is found in the Mendip Hills in Somersetshire. According to Berzelius it consists of—Lead 83·20; Chlorine 13·77; Carbonic acid 1·03; Silica 1·46; Water 0·54.

Sulphuret of Lead: Galena.—This almost universally diffused ore occurs in attached *crystals* and *massive*. Primary form the cube; the cleavage easy, parallel to its faces. Fracture conchoidal. Hardness 2·5 to 2·7. Scratched by carbonate of lime. Colour lead grey. Lustre metallic. Opaque. Specific gravity 7·568. *Massive varieties:*—Amorphous, structure granular, compact.

By nitric acid it is converted into white insoluble sulphate of lead. By the blow-pipe on charcoal the sulphur is first dissipated, and then metallic lead is obtained. In Cornwall and Scotland the veins of this ore traverse primary rocks. In Derbyshire it occurs in veins or beds in transition rocks. It very commonly contains a considerable portion of silver, and is often mixed with small quantities of some other metals. Galena is very commonly associated with calcareous and fluor spar, blende, calamine, carbonate and sulphate of barytes, and in Greenland with cryolite and spathose iron.

Analysis by

Dr. Thomson.		Boudan	
Lead .	85·13	Lead .	79·6
Sulphur .	13·02	Sulphur .	13·4
Iron .	0·50	Silver .	7·
	98·65		100·

Seleniuret of Lead.—Occurs massive. Structure granular. Colour lead-grey; resembles fine-grained sulphuret of lead, but is softer, and rather more blue. Lustre metallic, but rather dull. Opaque. Specific gravity from 7·187 to 7·697. When heated in a tube selenium sublimes; by the blow-pipe on charcoal it burns with a blue flame, and the peculiar odour of selenium. It occurs in the Harz.

According to the analysis of Rose, it consists of—

Selenium . . .	25·59
Lead	71·81
	99·40

Having described the principal native binary compounds of lead, we proceed to notice those which are composed of an *acid* and *oxide of lead*, remarking that it is the *protoxide* only which combines with acids.

Carbonate of Lead.—Occurs *crystallized* and *massive*. Primary form a right rhombic prism; cleaves parallel to the primary planes. Fracture conchoidal. Hardness 3·0 to 3·5. Brittle. Colour white, yellow, grey, and greyish-black, sometimes tinged green or blue by ores of copper. Lustre on the cleavage planes adamantine, on the fracture surfaces resinous. Translucent, transparent, and doubly refractive. Specific gravity 6·3 to 6·6. Phosphoresces when powdered and thrown on hot coals. Soluble in nitric acid with effervescence. By the blow-pipe on charcoal decrepitates, becomes yellow, and is reduced. *Massive varieties:*—Amorphous; structure columnar, granular, compact. Analysis by Dr. John:—Carbonic acid 15·5; oxide of lead 84·5. It occurs in most lead-mines, and is sometimes used as an ore of lead.

Sulphate of Lead: Anglesite.—Occurs crystallized and massive. Primary form a right rhombic prism. Cleaves parallel to the primary planes. Fracture conchoidal. Hardness 2·5 to 3. Colourless generally, but has sometimes shades of yellow, green, grey, brown, and black. Lustre nearly adamantine. Transparent, translucent. Specific gravity 6·23 to 6·31. Analysis by Klaproth:—Sulphuric acid 24·8; oxide of lead 71; water 2. Occurs in Anglesey, Cornwall, the Harz, &c.

Phosphate of Lead: Pyromorphite.—Primary form a rhomboid. Commonly occurs in hexagonal prisms, and cleaves parallel to its planes, and to the truncations on its terminal edges. Fracture imperfect, conchoidal, uneven Hardness 3·5 to 4. Colour various shades of green, yellow, brown, and grey. Lustre resinous. Transparent, translucent. Specific gravity 6·911 to 7·098. It also occurs botryoidal and reniform. Analysis by Wöhler:—Phosphoric acid 15·72; oxide of lead 82·30, muriatic acid 1·98. Occurs in most lead-mines, especially in those of Saxony.

Oxide of lead also occurs in combination with certain acids whose bases are metallic.

Arseniate of Lead: Gorlandite.—Occurs in *crystals* and *massive*. Primary form a rhomboid; usual form an hexagonal prism, which cleaves parallel to its lateral planes. Hardness 3·5 to 4·0. Colour pale yellow, yellowish and reddish brown. Lustre resinous. Transparent, translucent. Specific gravity uncertain, stated variously from 5·0 to 6·4, and 6·9 to 7·3. Analysis by Wöhler:—Arsenic acid 21·20; phosphoric acid 1·32; oxide of lead 75·59; muriatic acid 1·89. Found in Cornwall and in France.

It also occurs reniform. Structure compact, opaque. Lustre resinous. Colour brownish-red. Found in Siberia.

Chromate of Lead.—Primary form an oblique rhombic prism. Cleavage parallel to the lateral planes of the primary form. Fracture conchoidal. Hardness 2·5. Colour aurora-red. Lustre adamantine. Translucent. Specific gravity 6·004. It occurs also *massive:*—amorphous; structure columnar, granular. Analysis by Pfaff:—Chromic acid 32; oxide of lead 68. It is found in Siberia and Brazil.

Molybdate of Lead: Carinthite.—Primary form a square prism. Cleavage parallel to the primary planes. Fracture slightly undulating. Hardness 3·0. Colour different shades of yellow, greenish, and red. Lustre resinous. Translucent. Specific gravity 6·69 to 6·76. It rarely occurs massive. Analysis by Berzelius:—Molybdic acid 39·14; oxide of lead

60·86. Found chiefly in Carinthia, but also in North America, &c.

Tungstate of Lead: Scheelate of Lead.—Primary form a square prism. Cleavage parallel to the planes of the primary form. Fracture conchoidal and shining. Hardness 3·0. Colour yellowish white and brownish. Lustre resinous. Translucent. Specific gravity 8·0. Analysis by Lampadius:—Tungstic acid 51·72; oxide of lead 41·28. It is found in Bohemia and Carinthia.

Vanadiate of Lead: Johnstonite.—Occurs crystallized and in small globular concretions. Primary form a rhomboid. Fracture conchoidal. Brittle. Colour straw yellow to reddish brown. Dull, opaque. Specific gravity 6·99 to 7·23. Analysis by Berzelius:—Vanadiate of lead 74; chloride of lead 25·33; oxide of iron 0·63. Found at Tampico in Mexico, and Wanlockhead in Scotland.

There occur, besides the minerals which we have described, some other compounds of lead and different metals, for an account of which we refer to Phillips's 'Mineralogy' and Dr. Thomson's 'Outlines of Mineralogy and Geology.'

We now proceed to mention some artificial compounds and salts of lead, confining our description to such as are most curious in a scientific point of view or most useful in the arts. And first of the compounds of *Oxygen and Lead*, of which there are four: the first is the

Suboxide of Lead.—When lead is moderately heated in contact with air, a grey powder is formed upon it, which according to Berzelius is suboxide of lead, and Dulong states that oxalate of lead when decomposed by heat yields the same compound. It is a dark-grey powder, which is not soluble in acids, but resolved by them into protoxide and metallic lead. It is an unimportant substance, and is a di-oxide, consisting of

One equivalent of oxygen	8
Two equivalents of lead .	208
Equivalent	216

Protoxide of Lead; frequently called *Massicot.*—It may be procured by exposing lead to the action of heat and air, and is in fact so obtained in the process of making red-lead. It may also be obtained by decomposing nitrate of lead in a red heat. Its properties are, that it has a pale yellow colour; is insoluble in water, but readily dissolved by most acids, and is also taken up by the alkalis potash and soda, but not by ammonia. *Litharge* is also a semi-crystalline protoxide of lead, obtained in separating silver from lead ores. Of all the oxides of lead the protoxide is the only one which combines with acids to form salts, and they are all of them more or less poisonous. Protoxide of lead is composed of

One equivalent of oxygen	8
One equivalent of lead .	104
Equivalent	112

Deutoxide of Lead: Red Lead; Minium.—Is procured by exposing the protoxide to the long continued action of heat and air, by which it acquires more oxygen and becomes of a fine red colour; it is largely used as a pigment, and is especially employed in the manufacture of flint glass. It is not soluble in the alkalis, nor do the acids form salts with it, but they act upon it so as to separate it into protoxide, which dissolves, and binoxide likewise, which remains unacted upon. It is partially decomposed, and gives out oxygen when strongly heated, and also by the action of sulphuric acid. It is composed of—

Four equivalents of oxygen	32
Three equivalents of lead .	312
Equivalent	344

Binoxide or Peroxide of Lead is formed by treating the deutoxide either with nitric or acetic acid; when this is done the equivalent of red-lead is separated into 2 equivalents of protoxide, which are dissolved, and one equivalent of binoxide, which remains in the state of an insoluble brown powder. It is decomposed by the action of light, by a strong heat, and also by being converted into protoxide of lead and oxygen. It is not applied to any purpose whatever, and consists of—

Two equivalents of oxygen	16
One equivalent of lead .	104
Equivalent	120

Chloride of Lead.—When laminated lead is heated in chlorine gas, or when hydrochloric acid is added to a solution of acetate or nitrate of lead, chloride of lead is formed, when obtained by precipitation it is a colourless somewhat crystalline powder, which melts by the application of heat, and assumes on cooling a horny appearance, whence it was formerly called *horn lead*. It is sparingly soluble in water, and when a hot solution has been made, minute shining colourless crystals of chloride are deposited on cooling; these have a sweetish taste, and are not altered by exposure to the air.

It is composed of—

One equivalent of chlorine . .	36
One equivalent of lead . .	104
Equivalent	140

Oxichloride of Lead is used as a pigment by the name of *patent yellow*, and is prepared by the action of protoxide of lead upon common salt; for this purpose common salt may be made into a paste with about five times its weight of litharge and water. Action immediately commences, the mixture becomes alkaline owing to the presence of soda, while the chlorine of the salt unites with the protoxide of lead, and forms a white oxichloride, which by the application of heat becomes yellow; when it has been fused it acquires a crystalline texture on cooling.

It is probably composed of—

One equivalent of chlorine . .	36
Ten equivalents of oxide of lead .	1120
	1156

Sulphuret of Lead may be formed by melting a mixture of sulphur and lead-filings; in appearance it very much resembles lead, and is composed of—

One equivalent of sulphur . .	16
One equivalent of lead . .	104
Equivalent	120

It may also be obtained by adding hydrosulphuric acid to any solution of oxide of lead; the sulphur of the acid combines with the lead of the oxide, and a black precipitate is immediately formed, which, when dried and fused, has the usual appearance of sulphuret of lead.

Iodide of Lead is formed by adding a solution of lead to one of iodide of potassium; a yellow powder is precipitated, which is sparingly soluble in boiling water, and separates, on cooling, in brilliant flakes.

It is composed of—

One equivalent of iodine . .	126
One equivalent of lead . .	104
Equivalent	130

It has already been mentioned that acids combine only with the protoxide of lead; but with this several salts of great use in medicine, the arts, and scientific chemistry, are formed.

Carbonate of Lead.—This compound is very largely employed as a pigment under the name of *White Lead.* Various processes are adopted for its preparation, the oldest (which is still preferred by many manufacturers) is that of exposing sheet-lead to the action of the vapour of vinegar, in earthen pots, heated by tanners' spent bark. It is also prepared by passing the carbonic acid obtained by burning charcoal into a solution of di-acetate of lead, which is thereby converted into acetate of lead, which remains in solution, and carbonate of lead, which is precipitated. The acetate of lead is again converted into di-acetate by the addition of fresh portions of oxide of lead, and again precipitated. Carbonate of lead may also be procured by decomposing the acetate or nitrate of lead by carbonate of potash or of soda.

Carbonate of lead is a dense white powder, which is composed of—

One equivalent of carbonic acid .	22
One equivalent of oxide of lead .	112
Equivalent	134

It is decomposed by heat, which expels carbonic acid and leaves protoxide of lead, and also by the stronger acids.

Nitrate of Lead is formed either by dissolving the metal or the oxide in the acid; a colourless solution is thus obtained, which by evaporation yields colourless octohedral crystals of nitrate of lead. They decrepitate when heated moderately, and if strongly heated they are decomposed, yielding nitrous acid vapour and oxygen, protoxide of lead remaining in the retort. This salt is soluble in about 8 parts of

water at 212°, crystals depositing as the solution cools; it is insoluble in alcohol; the alkalis precipitate white hydrated oxide of lead; the carbonates, carbonate of lead; and hydrosulphuric acid throws down sulphuret of lead.

It is composed of—

One equivalent of nitric acid .	54
One equivalent of oxide of lead .	112
Equivalent	166

When nitrate of lead is boiled in water with an additional quantity of oxide, there is formed either a di-nitrate or tri-nitrate of lead, according to the quantity used; these are both very slightly soluble in water, and decomposed by carbonic acid.

Sulphate of Lead is readily obtained by adding sulphuric acid or a sulphate to nitrate of lead. It is a dense white substance, which is insoluble in water, little acted upon by acids, but is dissolved by potash and soda. It is applied to no particular use.

It consists of—

One equivalent of sulphuric acid .	40
One equivalent of oxide of lead .	112
Equivalent	152

Phosphate of Lead is also a white insoluble powder, but, unlike the sulphate, it dissolves readily in dilute nitric acid.

Acetate of Lead, frequently called *Sugar of Lead,* is very largely employed for various purposes. It is prepared by dissolving litharge in acetic acid, and evaporating the solution to its crystallizing point. The crystals are generally minute and prismatic; they are colourless, nearly inodorous, and have a sweetish astringent taste. This salt is soluble in about four times its weight of water at 60°, and much more so in boiling water. It is decomposed by the same substances as decompose the nitrate, and with similar results.

It is composed of—

One equivalent of acetic acid . .	51
One equivalent of oxide of lead .	112
Three equivalents of water . . .	27
Equivalent	190

When this salt is boiled in water with an equivalent of oxide of lead, di-acetate of lead is formed, which is used in medicine under the name of Goulard's Extract of Lead; and it is employed also in the manufacture of white lead, being decomposed by carbonic acid.

Chromate of Lead is largely employed as a pigment. It is of a beautiful yellow colour, and is prepared by mixing a solution of acetate or nitrate of lead with one of chromate of potash.

Characters of the Salts of Lead.—Those which are soluble have a sweetish taste: they give a white precipitate with the alkaline carbonates, which are dissolved by potash and soda, but not by ammonia. Ferrocyanide of potassium gives a white precipitate of ferrocyanide of lead; sulphuric acid and sulphates throw down insoluble white sulphate of lead; hydrosulphuric acid and hydrosulphate of ammonia precipitate black sulphuret of lead. Iodide of potassium and chromate of potash give yellow precipitates. Chlorides also throw down chloride of lead from solutions, unless they are extremely dilute. Zinc and cadmium separate metallic lead.

Alloys of Lead.—Lead fused with a fourth of its weight of potassium gives a solid brittle mass; it also unites with sodium, but the compound is less fusible. Alloyed with antimony lead forms *type-metal,* and common pewter consists of about 80 parts tin and 20 lead; equal parts of tin and lead form *plumbers' solder.* Mercury and lead combine very readily, but with copper it is difficult to unite it; with bismuth it combines easily, and with iron it forms two alloys. When iron and lead are fused together, the portion at the bottom of the crucible contains lead with a little iron, while the upper portion is iron with a little lead.

LEAD.—*History, Manufacture, and Trade.*—(French, *Plomb;* Italian, *Piombo;* Spanish, *Plomo;* Portuguese, *Chumbo* (all from the Latin *Plumbum*); German, *Blei;* Dutch, *Loot;* Russ., *Swinetz*). When newly melted, lead is of a silvery whiteness, but when it has been for a short time exposed to the air it assumes a dull and peculiar bluish tint, which is commonly designated *lead colour.* Lead is easily malleable, and exhibits this peculiarity, that it does not increase its specific gravity nor become harder through compression when subjected to the hammer. It is only in a very slight degree elastic, and is consequently not sonorous.

Lead was known and used by the Greeks and Romans for various purposes: among others it was employed for pipes to convey water, just as it is now. The lead-mines of this island were worked by the Romans, of which we have evidence in the pigs of lead preserved in the British Museum, and stamped with the names of the emperors Domitian and Hadrian. The early writers in this country, when speaking of the metals, are so confused, that it is by no means certain of which of them they are treating. This confusion is so great, that Sir George Harrison, when writing in exposition of the stannary laws of England, says, 'in a liberal construction, copper is tin.' The framers and early expounders of those laws fell into some strange mistakes regarding even the nature of particular metals. Camden derives the rights of the duke of Cornwall over tin from the circumstance of its containing silver, while lead is not considered a royal metal, because it contains no silver; the facts being the reverse, inasmuch as a considerable proportion of silver is frequently combined with lead, while it is very rare to find the smallest trace of it in tin.

The principal lead-mines in Great Britain are in Cornwall, Devonshire, Somersetshire, Derbyshire, Durham, Lancashire, Cumberland, Westmoreland, Shropshire, Flintshire, Denbighshire, Merionethshire, and Montgomeryshire; in Scotland at the Lead Hills on the borders of Dumfriesshire and Lanarkshire, in Ayrshire, and in Argyleshire. Lead is also found in Ireland, in the counties of Armagh, Wexford, Wicklow, Waterford, Clare, and Down. No certain account of the produce has ever been obtained, the proprietors or occupiers of the principal mines declining, from prudential motives, to give any statements to that effect. An estimate, which was made of the quantity raised and smelted in England and Wales in 1828, was generally believed to be near the truth, and this carried the produce to 45,500 tons: it is thought that the quantity has varied very little since that time. No estimate has been formed of the produce of the Irish mines, but it is not considerable.

The ore of lead, when extracted from the mine, is called *galena,* and is combined with various earthy matters. The first processes subsequent to its extraction are those of crushing or pounding and washing the ore, in order to separate as far as possible by mechanical means the impurities from the metal, which is then smelted, sometimes in a common smelting-furnace and sometimes in a reverberatory furnace, both of which are very similar in form and construction to the furnaces used for smelting and puddling iron. [Iron Manufacture.] When the fusion has been continued long enough to cause the expulsion of the sulphur contained in the ore, and the separation of the earthy matter in the form of scoria, the latter, which from its smaller specific gravity floats on the melted metal, is removed from the furnace through an aperture provided for the purpose, and the lead is allowed to run into a large iron pan, from which it is ladled into cast-iron moulds. It then constitutes what is called pig lead. The scoria still contains a portion of lead, and is subjected to the heat of another furnace, called a slag-hearth, for its separation, which occurs upon its fusion; the metal then falls into a cavity, whence it is run and also cast into pigs. In this state lead always contains more or less of silver. The proportion is sometimes exceedingly minute, being not more than 1 ounce or 1½ ounce per ton in the metal raised in Derbyshire and Shropshire, while in every ton of the lead from Devon and Cornwall there is found from 20 to 30 ounces of silver. The produce of other mines contains the more precious metal in various proportions between these two extremes. The extraction of the silver is always performed when it exists in a proportion sufficient to pay the expense of the process, which varies in different localities according to the cost of fuel. The process of extraction, which is called refining, depends upon the well-known circumstance, that lead, when heated to redness, absorbs a large portion of oxygen from the air, and is converted into an oxide, while silver does not undergo any such change, but retains its metallic form at almost any temperature. A *cupel,* which is a shallow dish of adequate dimension, is filled with a mixture of burnt bones and fern ashes pressed down, upon which the lead to be refined is placed in the furnace. As soon as the lead is melted, a blast of air, introduced by the usual means, is made to play forcibly upon the surface, and in a short time a crust of yellow

oxide is formed, and this is driven away, as fast as it appears, to the opposite side of the furnace, until all or nearly all the lead has been thus converted to an oxide. The silver, which remains behind, is still combined with some portion of lead, and must be subjected to a second process similar to that here described, in order to obtain it in sufficient purity. The litharge, into which the lead has been thus converted, is easily restored to its metallic state by again heating it in a furnace in combination with carbonaceous matter, to which it gives up its oxygen. There is a considerable waste of material when thus treated, varying according to the quality of the lead. The oxide is very volatile at high temperatures, and so much of it escapes in a vapourous form during the process of refining, that the difference of weight before and after its completion is on the average about two-fifteenths. A new process for the extraction of silver from lead has been successfully used in the county of Durham, and was described by Mr. H. L. Pattinson, to the Mineralogical section of the British Association at its recent meeting (1838) in Newcastle. Having observed that in a mass of melted lead crystals were formed as the temperature was diminished below the point of fusion, Mr. Pattinson conceived that these crystals might be more homogeneous and would consequently be united with a smaller proportion of silver than the remaining uncrystallized mass. This idea, proving upon experiment to be correct, has been made practically useful by subjecting the lead to be refined to repeated processes of crystallization by means of a simple apparatus. This consists of a series of hemispherical iron pots, each capable of holding five tons of lead, ranged side by side, and furnished with separate fire-places. The mode of operation is as follows:—One of the pots is charged with lead, and when this is melted, the surface is skimmed in order to remove such impurities as are thrown up. The fire is then withdrawn, and the lead is suffered to cool gradually. When the process of crystallization begins, the crystals are withdrawn by means of ladles with perforations to allow the uncrystallized part to run through, and these crystals are transferred to the second pot, when they undergo a second melting and crystallization, and subsequently a third in another pot. The crystals collected at this third process are found to contain no more than from 10 to 15 dwts. of silver per ton, and are consequently melted and cast into pigs for sale as refined lead. The process here described is repeated with the remaining portion of the lead until it is so rich in silver as to contain from 200 to 300 ounces per ton, after which the silver is extracted by the old process of cupellation. As the proportion of the lead to which this wasteful process is applied does not exceed one-twentieth of the whole quantity of metal, the loss is diminished in a like proportion, and seldom exceeds one part in 120, by which means the expense of the extraction of silver is so far economised, that it will answer to apply the process to lead which originally contains any proportion greater than three ounces of silver to the ton. Independent of the great saving of lead, it is computed that the general adoption of the crystallizing process would occasion an annual gain to this country of 54,000 ounces of silver, through the larger quantity of metal which may be profitably subjected to the process of separation.

The most extensive use of lead is in the form of sheets, and pipes, or tubes, for the passage of liquids. To make sheet-lead the pigs are brought to a state of fusion in a large pot or cistern, near to which is placed the table on which the sheet is to be cast. This table, which is usually from 18 to 20 feet long and six feet wide, was formerly made of wood, and indeed wooden tables are still frequently used, but in many works cast-iron has of late been substituted. The wooden table has its surface protected by a layer of fine sand, which is wetted and spread evenly and firmly over it before the melted lead is poured on. To prevent the lead from running over the sides a ledge is provided, two or three inches thick, and two inches high, which forms the margin of the table. An instrument called a strike is also provided to regulate the thickness of the sheet, and to spread the melted metal evenly over the table. This strike, which is made wider than the table, rests by its two ends on the ledges, the size or diameter of the part within those ledges being adjusted according to the intended thickness of the sheet, which will be equal to the distance between the lower side of the strike and the layer of sand. In casting the sheet the fused metal is taken from the cistern with an iron ladle, and put into a triangular shaped iron shovel or peel, placed at the head of the table, which peel being raised so as to pour out the lead upon the table, the strike is brought into use to spread it evenly over the whole surface; the surplus, if any, falling into a vessel placed for its reception at the foot of the table. A sheet of lead weighs 9 cwt., so that its length and breadth will be greater in proportion to the diminution of its thickness. The thickness of sheets of lead is frequently reduced by means of heavy rollers worked by steam-power. Sheet-lead of different thicknesses is described by those who use it as being of so many pounds weight to the superficial square foot. The following table shows the thickness, in decimal parts of an inch, corresponding to certain weights per square foot —

Thickness.	Pounds per sq. foot.	Thickness.	Pounds per sq. foot.	Thickness.	Pounds per sq. foot.
·10	5·899	·14	8·258	·18	10·618
·11	6·489	·15	8·848	·19	11·207
·12	7·078	·16	9·438	·20	11·797
·13	7·668	·17	10·028	·21	12·387

It will be easy to compute from the foregoing figures the weight per superficial square foot of sheets of any other given thickness. The descriptions most commonly used for roofing, guttering, and the like purposes, are comprised within the limits above stated.

Lead pipes are sometimes made, when great exactness of shape is not required, by bending a length of sheet lead of the necessary width over a mandrel, and soldering the edges together, but the more usual method of manufacture is by casting and drawing. The casting-box employed is an iron cylinder made in two parts, and put together longitudinally with flanges; inside of this cylinder is placed an iron rod or core, which is so fixed as to be concentric to the cylinder, without touching it; a space is thus left into which the melted lead is poured. When this is set, the core is removed and the cylinder opened, so as to withdraw the pipe, which is much thicker than is needed, and must be lengthened, while its substance is reduced, by drawing it through a succession of holes in steel plates, diminishing gradually in diameter similarly to the method employed in drawing iron rods. [IRON MANUFACTURE.] The machinery employed for this process has at different times been much improved in its construction, so that it is now of rare occurrence to meet with an imperfect pipe.

Without entering into any description of the various machines and utensils made with this metal, whose qualities or uses depend not so much upon the material employed as upon their form and construction, it may be proper to give some explanation of the mode of manufacturing leaden shot by pouring the melted metal from a great height into water. This process was invented in 1782 by a workman named Watts, residing at Bristol, who is said to have conceived the idea in a dream, and to have proved its practicability by pouring some melted lead from the tower of the church of St. Mary Redcliffe at Bristol. Having secured the invention by a patent, he sold it to parties possessed of adequate capital, and the patent having long since expired, the process is now in common use. In order to give to the lead the quality of assuming a more perfectly globular form in cooling, the metal is previously alloyed with arsenic in the proportion of two lbs. to one hundred-weight, or with a small quantity of mercury, which latter is used in order to obviate an objection caused by the poisonous quality of arsenic. Shot formed by granulation are made in a high tower, in the top of which the melting-room is placed. Close to the furnace is placed a large colander, or perforated plate, into which a portion (determined by experiment) of the scoria produced in melting the metal is placed, when the metal is ladled into it. Being somewhat detained by the scoria, it is partially cooled and divided into separate portions, which pass through the colander in the form of globules, which follow in such rapid succession as to have the appearance, to a cursory observer, of a continued stream. These globules fall into a tub of water placed on the lower floor of the tower. The shot thus formed are of various sizes, and a small proportion are imperfect as regards sphericity. Having been perfectly dried by artificial heat, the shot are sorted according to their sizes by means of a series of sieves, the meshes of which have different degrees of fineness. A sieve having the smallest meshes is first used, that the smallest sized shot may pass through and be collected. What remain are transferred to the sieve next in fineness, to separate shot of the second size, and so on in succession. The process of separating the imperfect shot is very simple, and is thus

performed:—A shallow wooden tray is suspended by cords from the ceiling of the room, and into this a certain quantity of shot is put: by raising one end of the tray, and giving it a motion from side to side, the shot will roll about, such as are perfectly spherical finding their way off the tray into a reservoir placed at its lowest side, while those which are of imperfect form run against and are detained by the sides of the tray, so that they can be collected in a separate vessel after the perfect shot have all run off. The shot thus sorted are then polished by putting about half a ton together into an iron barrel which that quantity will nearly fill. By means of a rotary movement given to the barrel, the shot are made to rub against each other, and thus acquire a black colour and a lustrous appearance.

The quantity of lead produced in this country is much beyond what is wanted for home use, and the surplus is necessarily exported. The trade in this metal with foreign countries and British dependencies, during each of the last ten years, has been as follows:—

	Foreign lead.		British lead and shot exported.	
	Imported. Tons.	Exported. Tons.	Weight. Tons.	Value.
1828	2,479	1,784	10,021	£177,983
1829	1,508	1,700	6,834	114,555
1830	662	859	7,442	106,789
1831	1,232	1,234	6,777	96,333
1832	1,090	957	12,181	144,653
1833	790	857	9,015	120,714
1834	969	865	8,672	142,513
1835	1,276	1,268	11,082	195,144
1836	1,893	913	9,769	224,981
1837	1,806	1,520	7,863	155,257

The above quantities are exclusive of litharge, red lead, white lead, and lead ore, which are every year exported in considerable quantities. The export of British lead, in all its forms, during each of the foregoing years, has been as follows:—

	Tons.		Tons.
1828	13,256	1833	11,145
1829	8,647	1834	10,411
1830	9,309	1835	13,372
1831	7,932	1836	11,418
1832	13,898	1837	9,560

The foreign lead imported is almost wholly supplied by Spain, the produce of exceedingly rich mines situated at Adra in Granada. The quantity furnished by those mines has fluctuated greatly; a circumstance, in all probability, owing to the unsettled state of the country. The greater or less produce of these Spanish mines has a great influence upon the price of lead in every market of the world; and at times has acted injuriously upon the mine-owners in this country, who have however, during the last few years, been realizing great profits. The market price of lead in London, during the spring of each of the last ten years, has been:—

	Per fodder of 19½ cwt.		Per fodder of 19½ cwt.
1829	£17 10 0	1834	£17 15 0
1830	13 10 0	1835	18 15 0
1831	14 15 0	1836	27 15 0
1832	12 10 0	1837	23 5 0
1833	14 0 0	1838	21 15 0

The principal markets for English lead are Russia, France, Holland, the British possessions in India, Brazil, and the British colonies in America.

The produce of the Spanish lead-mines, and its distribution in each of the years 1836 and 1837, as stated by a very competent authority, was as follows:—

	1836. Tons.	1837. Tons.
Estimated produce of the mines	25,000	15,000
Exports to France	16,700	12,000
Italy, the Adriatic, and Sicily	1,700	2,000
Belgium and Holland	1,600	1,600
England	600	500
North of Europe	400	1,000
Portugal		400
Gibraltar and Spanish ports, mostly in transit for foreign markets	2,000	3,500
	23,000	21,000

Some lead-mines have been opened and worked upon a small scale in Missouri, one of the United States of North America. The total produce of this metal in the United States, in each of the ten years from 1826 to 1835, the latest as to which the accounts have been made public, was:—

	Tons.		Tons.
1826	1,042	1831	2,879
1827	2,720	1832	1,911
1828	5,496	1833	3,545
1829	6,451	1834	3,558
1830	3,719	1835	1,676

LEAD, MEDICAL PROPERTIES OF. In a purely metallic state, lead produces no action on the human system, except such as arises from its mechanical properties; but as soon as it has become oxidized, it can combine with the contents of the stomach, and produce different effects, according to the nature of the substances it meets with: hence even a leaden bullet, swallowed, has given rise to the symptoms characteristic of the presence of lead. 'In whatever form lead is habitually applied to the body, it is apt to bring on the train of peculiar symptoms: the inhalation of its fumes, the habitual contact of any of its compounds with the skin, the prolonged use of them internally as medicines, or externally as ointments and lotions, and the accidental introduction of them for a length of time, with the food, may, sooner or later, equally induce *colica pictonum*, or painters' colic. Of all exposures none is more rapid or certain than breathing the vapours or dust of the preparations of lead.' (Christison.) Thus the workmen at Lead Hills in Lanarkshire are stated never to have the lead-colic until they work at the smelting furnaces. The action of lead on the human frame differs greatly according to the kind of preparation of lead, the quantity employed, the length of time or frequency of exposure to it, and the channel of its introduction into the body. If injected into a vein, acetate of lead, even in small dose, will produce almost immediate effects; while if taken into the stomach it is much slower, and a considerable quantity is requisite to produce serious consequences. In the latter instance the effects are both local and remote: 'One class of symptoms indicates inflammation of the alimentary canal; another, spasm of its muscles; and a third, injury of the nervous system, sometimes apoplexy, more commonly palsy, and that almost always partial and incomplete. Each of these classes of symptoms may exist independently of the other two; but the last two are more commonly combined.' (Christison *On Poisons*, p. 511.) The rapidity of action is also determined by the solubility of the preparation or salt of lead; while the degree of effect is also closely connected with the solubility, the more insoluble salts being nearly powerless—a circumstance which supplies a convenient mode of disarming the others of their virulence by converting them from soluble to insoluble salts. Fatal cases from poisoning by large quantities of the salts of lead are not numerous, as there is in general time to administer antidotes; but death from the slow and insidious introduction of lead into the system is of frequent occurrence. The principal source of these is the use of water or other fluids containing lead in solution, the intermixture of lead, as adulterations or accidentally, with articles of food, or handling preparations of lead in the daily business of artisans, such as painters, plumbers, &c.

The danger of using water from leaden pipes or cisterns was known even to the Romans; nevertheless they are still extensively used, and the rarity of any fatal results shows that the risk has been much overrated. This is sufficiently explained by the protecting power of the insoluble salts of lead, formed by the action of the ingredients of the water on the lead, which hinders the subsequent supplies of water from coming in contract with the metal. Waters however which are remarkably pure, and particularly distilled waters, dissolve the lead, and becoming impregnated with it, cause serious accidents. But waters which abound with calcareous salts, or hard waters, speedily encrust the interior of the cistern, and remove the source of danger. The more impure the water, the more certainly will it form a protecting incrustation; hence the Thames water scarcely ever produces hurtful effects from standing in leaden cisterns previously to being used. No water should ever be drunk or employed for culinary purposes out of *new* cisterns; but water should be allowed to stand in them for some time without being renewed, for only after a crust has been formed does the water become safe; or to expedite this, a little phosphate of soda or iodide of potassium may be added, or a few drops of sulphuric acid may be used.

The lid or cover of cisterns should never be made of lead, as the vapour which condenses on it possesses all the solvent power of distilled water. It is also unsafe to use water which has flowed over leaden roofs, more particularly in towns, as the surface of the lead is almost invariably coated with some soluble salt.

It is however an error to attribute all the changes which lead used for roofs or cisterns undergoes solely to the corrosive power of water. (See case by Dr. Wall, quoted in Christison, p. 488, edit. 1836.) The holes with which the lead is often riddled are caused by the larva of an insect, the *Callidium bajulus*, in the stomach of which lead is often found. (Kirby and Spence's *Entomology*, i., p. 235.)

Perfumed distilled waters, such as orange-flower water, often contain lead in solution, derived from the solder cementing the copper vessels in which these are imported, whenever lead has been employed instead of tin solder.

No kind of adulteration or impregnation with lead, from accident or ignorance, is more common than that of wine or cyder. Even a single shot of lead left by accident in a bottle after cleaning has produced severe colic; and the more extensive use of the salts of lead to *fine* wines, as it is termed, that is, to remove their acid taste and make them sweet, has occasioned most serious consequences. In the cyder-presses, and in the worms of stills, lead was formerly employed, but it is now nearly banished from use. Lead is sometimes employed either ignorantly or fraudulently, to render tart and bad wines marketable. The lead, if present, may be detected by appropriate tests, among others by *Hahnemann's wine test*, made by putting into a small phial sixteen grains of sulphuret of lime, prepared in the dry way, and twenty grains of cream of tartar. The phial is to be filled with water, well corked, and occasionally shaken for the space of ten minutes. When the powder has subsided, the clear liquor is to be decanted off, and preserved in a well-stopped bottle. This liquor, when fresh prepared, discovers lead by causing a dark-coloured precipitate. Domestic and British wines, the nature of the fruit used in preparing them unavoidably causing them to be more acid than those prepared from the grape, are most likely to be impregnated with lead, particularly as in some cookery books it is ignorantly recommended to sweeten them.

Another important source of impregnation of articles of food with lead is connected with the use of earthenware glazed with lead. Anything containing vegetable acids, if kept in such vessels, will act on the lead, and may produce poisonous effects. Even milk cannot be kept with safety in leaden-glazed dishes. For all preserves, jellies, &c., Bristol ware, which is glazed with salt, should be employed. Nothing can be more dangerous than to keep vinegar in leaden bottles, or even in jars glazed with lead. The use of acetate or sugar of lead to clarify syrups or honey, or to render brandy pale, is to be avoided. Rum, hollands, and geneva are occasionally adulterated with lead, and cause extensive evil. Colouring cheese with red-lead is equally hazardous.

In small medicinal doses acetate of lead, which is almost the only salt administered internally, produces a direct action on the secretions of the stomach, combining with the albumen, and forming compounds which are for the most part insoluble in water and acids, bnt occasionally forming other compounds which are soluble by the addition of a small quantity of acetic, hydrochloric, or lactic acid. As these acids exist in variable quantities and under different circumstances, the degree and kind of action will be different, according as the lead is dissolved and conveyed to distant organs, or as it remains nearly undissolved and accumulated on the mucous membrane. In the greater number of cases it is very slowly introduced into the circulation. Even a considerable dose may display merely local effects, exciting irritation and inflammation; though these are sometimes followed by colic, convulsions, coma, or local palsy.

By a repetition of small doses the secretion of most mucous surfaces is diminished, and constipation occurs; the heart's action is reduced, and the calibre of the arteries is lessened and exhalation checked: if hæmorrhage should exist, that generally stops. Acetate of lead thus appears to be decidedly sedative and astringent. It manifests its sedative effect even when applied externally, and lessens discharges from ulcers, though its application to these is not always safe. Even white-lead (carbonate of lead) ointment applied to ulcers has proved fatal.

Acetate of lead should always be dissolved in distilled, not in common water. It is a most improper application to inflamed cornea whenever that is ulcerated, as it forms a white compound which is apt to get imbedded in the cornea.

The diseases in which it proves most useful are increased discharges either from mucous surfaces or in hæmorrhages. In diarrhœa, dysentery, but, above all, in cholera, when combined with opium, it is a most efficacious remedy (Dr. Graves, in *Medical Gazette*, Oct. 14, 1837); in fevers attended with diarrhœa it is also useful. Combined with opium on which boiling water has been poured, it forms a most grateful wash to erysipelatous and other inflamed surfaces. In all cases care must be observed in its use. In poisoning by acetate of lead or by litharge, the best antidotes are sulphate of soda (Glauber salts), sulphate of magnesia (Epsom salts), or alum, to decompose or form an insoluble compound, and afterwards the stomach-pump may be used, or emetics of sulphate of zinc may be given. [PAINTERS' COLIC.]

LEAD, BLACK. [PLUMBAGO.]

LEAF, THE, is an expansion of the bark of a plant, from whose axil a leaf-bud is developed. It is usually thin, and traversed with one or more veins, composed of woody and vascular tissue; sometimes it is fleshy, and occasionally cylindrical, or nearly so. Its veins form a double stratum, of which the upper is in connection with the alburnum, and the lower with the liber of the branch on which it grows. When leaves have been macerated long enough, it is easy to separate these two strata. The veins are held together by a green or coloured parenchyma, which is enclosed in an epidermis pierced by stomates or openings, supposed to be for the purpose of respiration. A leaf is either united to the stem by means of a petiole or stalk, or it is sessile, that is to say, seated on the branch without an intermediate stalk; through the petiole pass the veins before they can expand into the broad or green part forming the blade of the leaf. When the stem is angular, the leaf is not confined to the angles or the spaces between them, but grows from either indifferently, only uniformly in the same species.

The petiole is usually articulated with the stem, rarely with the blade of the leaf; the latter however sometimes happens, as in the orange. It usually loses itself in the parenchyma of the blade, but sometimes passes beyond it, and in compound leaves often forms a tendril or spine. Sometimes, as in the orange and in Nepenthes, and some other plants, it assumes the appearance of the leaf itself. Occasionally, as in New Holland Acacias, it is the only part of the leaf that the plant continues to bear after infancy, and, in the opinion of some botanists, it is what we call the leaf in the majority of Endogens; the latter however is an opinion but little held. It is not uncommon for the petiole to expand into a sheath (*vagina*) surrounding the stem, as in grasses, orchidaceous and many other plants. Some writers have believed this to be a special organ, because in certain instances leaves have both a flat sheathing base and a tapering body bearing the blade; but in such cases there is nothing more than a petiole dilated at the base and contracted at the apex.

Some leaves are furnished with an appendage, which in grasses is a thin membranous body arising from the base of the lamina, and in palms is a coarse net, formed, as is said, of tissue belonging to the veins of the leaves.

When leaves have but one blade, they are simple, as in the apple; but when there is more than one blade, each seated on a ramification of the petiole, a leaf is called compound. Of these and of the external form of the leaf there are endless modifications. Between 200 and 300 are enumerated by Bischoff. (Lindley's *Introduction to Botany*; Bischoff's *Handbuch der Botanischen Terminologie*.) Their normal figure is oval, produced by two arcs which intersect each other at each end. They are consequently quite symmetrical, the one side being exactly like the other; here and there however instances to the contrary are found, especially in Ulmaceæ and Begoniaceæ, where the two sides of the base, and in Orchidaceæ the two sides of the apex, are unequal; such leaves are called oblique.

The substance of the leaf consists of parenchyma, connecting the veins of woody and vascular tissue. It differs greatly in different plants, and appears to be so arranged as to meet the wants of the species in which it is found. Usually the cells of parenchyma belonging to the upper

surface are planted perpendicularly upon the epidermis, while those of the under surface are parallel with it; but this varies very much, and it often happens that the arrangement of the parenchyma is alike on both sides of the leaf. All that appears uniform with respect to this substance is that it contains grains of chlorophyll in abundance, that it is traversed by air cavities in all directions, and that the latter are universally in communication with the stomates. The usual cause of the under side of leaves being paler than the upper is that the parenchyma is more cavernous on that side than the other.

In their position leaves are usually either alternate or opposite, in pairs upon the stem; in some however there are more than two leaves placed on the same plane, which are called verticillate. But when leaves are so closely arranged upon a stem that their bases touch, as in pine cones, the pine apple, the young shoots of asparagus, and in all leaf-buds, it universally is found that they indicate a spiral direction; and observation has shown that in fact this is the real plan of arrangement, however much it may be obscured by one cause or other. The subject of spiral arrangement in leaves has been treated as a mathematical question by Messrs. Schimper, Braun, Bravais, and others. (Link, *Elementa*, i. 448, ed. 2.)

Independently of their ordinary variations in form, leaves occasionally assume extraordinary appearances. Of this nature are those which, developing under water, form only their veins, without any connecting parenchyma, and consist of delicate thread-shaped segments. Another kind are the pitchers or hollow water-vessels found upon such plants as Nepenthes, Sarracennia, Dischidia, &c., in which some part of the leaf is rolled up so as to form a cavity capable of holding water. When such bodies have a lid, the latter is always the lamina, and the pitcher itself the modified petiole. In this country we have something of the kind in Utricularia, which forms under water little transparent bags, determined to be petioles by their analogy with the same parts in exotic species, in which a lamina also exists.

The most remarkable modifications of the leaf are however those common ones where it changes first into a bract, then successively into sepals, petals, stamens, and carpels. That those organs are really mere modifications of leaves is now so well known as to require no evidence to support the statement. (Lindley's *Introduction to Botany*, p. 524, ed. 2.)

By Linnæus certain kinds of leaves were called fronds, upon the supposition that they were a composition of both leaf and branch fused as it were together. He applied the idea to palms and ferns chiefly. No one now entertains such an idea of palms, whose foliaceous organs, although of very large size, sometimes as much as 30 or 40 feet in circumference in the Talipot Palm of Ceylon, differ from ordinary leaves in nothing else. The term is still applied to ferns, but upon no intelligible ground, as in those plants also any comparative anatomist can demonstrate that the so-called fronds are entirely analogous to the leaves of other plants. It is only in Lemna, Marchantia, Lichens, and such plants, that a frond, that is, a combination of leaf and stem into one body, is to be found.

The function of leaves is to elaborate the crude sap sent into them by the stem, to digest it, convert it into the secretions peculiar to each species, and to direct it afterwards into the bark. In order to enable them to perform these important duties, they have a very large surface exposed immediately to light and air; a still larger surface capable of respiration, if we consider their innumerable air-chambers; and there are passages through their epidermis to regulate their respiration and perspiration. The latter is brought on chiefly by the stimulus of solar light; to guard against the excessive action of which they are in all cases protected by a tough homogeneous cuticle lying on the outside of the epidermis, and by peculiar arrangements of the cells of the latter part, which are thin and thin-sided, or thick and thick-sided, in one stratum or in many strata, according to the circumstances under which a plant is intended naturally to grow. In submersed plants this provision is so slight that their leaves shrink up and wither as soon as they are exposed to the air: in plants destined to inhabit dry, hot, sunburnt situations, the provision is so abundant that they will live for many months without any supply of moisture.

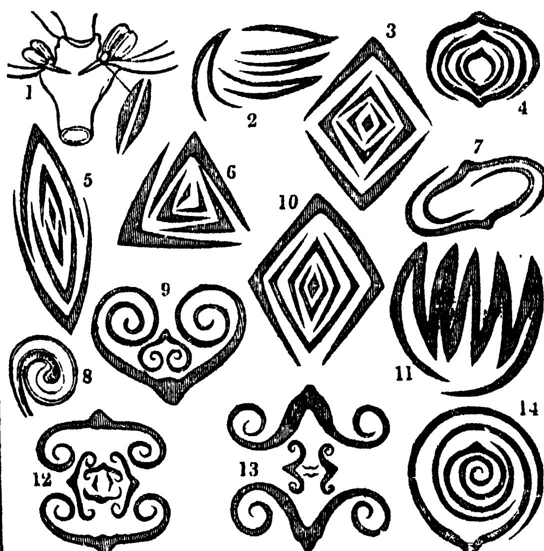
It is in consequence of these important offices which the leaf is intended to perform that in all plants it is so indispensable that they should be protected from injury of what ever kind.

LEAF-BUD, is an important organ of plants. It consists of leaves in a rudimentary state, resembling scales, arranged one over the other, and usually in a spiral manner, around a cellular conical centre, which has the power of growing upon the application of certain stimuli, namely, light and moisture combined with a variable degree of temperature. It is regarded by physiologists as a miniature plant, partaking in some measure of the nature of the embryo, and although in its natural condition only forming part of a complicated system of organization in connection with other leaf-buds, yet having an independent power of growth, which it is capable of exercising, if separated from the branch or system to which it belongs. This fact is obvious in the common gardening operation of propagation, for which purpose the buds of plants are cut off and made to form new individuals, as in the process called *budding*, in striking from *eyes* (*i.e.* leaf-buds), grafting, layering, propagation by cuttings, and the like. None of these operations can succeed except through the independent vitality of the leaf-bud. For this reason a plant must be considered a compound being, analogous to polypes and similar zoophytes.

As the leaf-bud is of this essential importance to a plant, nature takes the utmost care to guard its delicate internal tissue from accidents. For which purpose the external scales are filled and divided by air, and consequently form numerous non-conducting plates; or they are in addition clothed with a thick fur, with a soft resin, or with other similar secretions.

The leaf-bud is always produced in the axil of a leaf, and placed in immediate communication with the cellular horizontal system of a plant, of which system it is a peculiar development; and it is especially deserving of notice, that all leaves or modifications of leaves, be their external form or colour what they may, are capable of forming leaf-buds in their axils.

The manner in which the scales of a bud are packed varies very much; if we suppose them to be looked at when cut transversly, the sections will represent the following appearances, to which the names added at the foot of the wood cut are technically applied.



1. Applicative, or appressed - - - (Viscum album).
2. Conduplicate - - - - - - (Cerasus communis).
3 Imbricate - - - - - - - (Syringa vulgaris)
4. Equitant-terete - - - - - (Vaccinium Myrtillus).
5. Equitant ancipital - - - - - (Iris germanica).
6. Equitant triquetrous - - - - - (Carex paludosa).
7. Obvolute, or semi-amplexal - - - (Saponaria officinalis).
8. Gyrate, or circinate - - - - - (Drosera anglica).
9. Involute - - - - - - - (Viola odorata)
10. Equitant tetraquetral - - - - - (Some Carexes).
11. Plicate - - - - - - - (Vitis vinifera).
12. Involute (a variation) - - - - (Pyrus Malus).
13. Revolute - - - - - - - (Polygonum Persicaria).
14. Convolute, or supervolute - - (Prunus Armeniaca).

LEAGUE, LEUCA, LEUGA, LEUVA, LEWEKÉ, &c. An itinerary measure, which in modern English always means the twentieth part of a degree of latitude, or three of what are called geographical miles, each of which

is the sixtieth part of a degree. The variation of the degrees of latitude is not sufficient to make this measure sensibly incorrect for nautical purposes; and the league of our sailors may be described and easily remembered as 3·456 statute miles of 1760 yards each. The same marine league is used by the French and other nations: besides which the French have among their itinerary land measures two distinct leagues (or *lieues*, in some of the provinces *lègues*), the first of 2000 toises, or 2·42 English statute miles, which is the legal posting measure; the second of 25 to the degree, or 2·77 English miles. These are selected from among the French measures for their celebrity, and not as being the only ones: for before the Revolution there was no legal itinerary measure, and the length of the league varied from province to province. (Paucton.)

The *leuca* of the antient English law writers is necessary to be determined before the rights given by many charters can be defined; but unfortunately the length of this measure is enveloped in utter confusion. The modern lawyers, we believe, evade the question by setting it down as a mile; thus the legal minimum distance between two markets, which was certainly seven leucæ, is now called seven miles. We shall, in the present article, collect a few testimonies on the length of the leuca, and must leave the reader to form the best opinion which he can upon the varying presumptions which they afford.

By citations in Ducange, Paucton, &c., it appears that Hesychius distinctly describes the λεύγη,* and Jerome, Jornandes, &c., the leuca (stated by Camden to be derived from the Celtic *leach*, a stone) as a Gaulish measure; and the original Gallic league was set down by the Romans as a mile and a half of their own measure, which was in all probability a rough estimation, first used in the Itinerary of Antoninus. In that work the distances from place to place in Gaul are frequently given in leagues (always in whole numbers), which are in every instance reduced to Roman miles at the rate of a mile and a half to each league. (See also Amm. Marcell., xvi., c. 12.) Hence, taking the Roman foot at 11·62 English inches (which is a mean between the most trustworthy measures) and the pace of five feet at 58·1 inches, the Roman mile of 1000 paces is 1614 English yards, and the leuca was therefore 2421 yards, subject to the error of the Roman estimation; or 1·376 modern English miles, with the same reservation.

This leuca in all probability was brought by the Normans into England. It is true that the Saxon charters of Ingulphus describe distances in leucæ; but the genuineness of these charters is now considered more than questionable, and perhaps this very circumstance is a presumption against them. But the leuca soon began to vary in size. Ducange cites an old metrologist who speaks of two leucæ, the one legal, of 3000 paces, the other common, varying much in different countries. In the confusion incident to our subject, it will be worth while to remember that it was not uncommon, when a measure was found too short for convenience, to double it without altering its name: thus among the list of old coins (1540) given by John Dee, is found the *penny of two pence*. The registers of Battle Abbey (Sir H. Ellis) and the 'Monasticon Anglicanum' (Ducange) describe the leuca as containing 12 quarantenæ, or furlongs. Now the furlong (forty-long) is always 40 perches, and the perch, though varying much, yet was settled very early at 16½ feet. This gives a modern statute mile and a half to the leuca; so that a certain set of old authorities countenance the notion that the leuca was in their time very little more than that of the Gauls. It is not worth while to take into account any possible variations of the foot: since all the information we can obtain is too rough even to make the whole difference between the Roman and modern English foot of consequence.

The earlier statutes do not define the itinerary measures; confining themselves entirely to those by which land and goods were bought and sold. And the itinerary measures seem to have been on the increase, perhaps for the following reason:—The jurisdiction of towns, monasteries, &c., was usually defined as extending a leuca or a given number of leucæ in every direction from their precincts, so that it became the interest of these powerful bodies to make the leuca as long as possible. The old French term ban-lieue, banni-leuca, or league of the edict or regulation, refers to the space over which jurisdiction was granted. Ingulphus perhaps lets us a little into the secret when, speaking of his own monastery, he says, 'Prudentissimi metatores, contra malitiam emulorum nostrorum piissimé providentes, potius plus quam minus ponere voluerunt.' The same Ingulphus informs us that in his time the usual league was of 2000 paces, or 1·835 modern English miles, if the Roman pace be meant: but he adds that the English, adopting a Norman word to their own measure, frequently spoke of leucæ when they meant miles. But it may be questioned whether the mile and the leuca ever became interchangeable words in writings or charters, at least in England: in several continental countries the term mile never became vernacular, and miliare is therefore translated by league.

There is sufficient evidence to show, that whatever the mile of a later date may have been, the leuca was generally two miles; though instances occur in which it is still described as 1500 paces. The following are extracts with which we have been favoured from manuscripts in the British Museum. In the registers of the monastery of Canterbury (of the fourteenth century) we have the following: 'Mensura unius pollicis incipit ex transverso radicum unguinum pollicis. Tres pollices unam palmam faciunt: quatuor palmi faciunt unum pedem. Pes et dimidium faciunt cubitum parvum: Sex parvi cubiti faciunt cubitum magnum. Quinque pedes faciunt passum unum. Centum viginti quinque passus faciunt stadium unum. Octo stadia faciunt unum miliare. Duo miliaria faciunt unam leucam.' This gives a leuca of 10,000 feet. Again, in the same manuscript: 'Memorandum quod virga communis continet xvi. pedes et dimid. videlicet quinque ulnæ et dimid. secundum standardum Regis. Idem xl. virgat. continent i. quarantenam. Item vii. quarantenæ et dimid. iii. virgat. et ii. palm. continent unum miliar. Item duo miliar. continent i. leucam.' This gives a leuca of the same length. In a manuscript supposed to be of the time of Edward IV. we find 'v. fote make a pase, and ther go viii. forelongs to a mile in Yngland, and ii. ynglysch myle make a ffrenshe leweke.'

Bracton (Henry III.) and Fleta (Edward I.?) both assert (see the citations in Cowell, Comyns's 'Digest,' &c.) 6 leagues and half a league and the third part of a half (or 6⅔ leagues) as being the distance between two markets which do not injure each other: because 20 miles is a reasonable day's journey: now (both of them say) if the *dieta*, or day's work, be divided into three parts, the first is for going to the market, the second for business, and the third for returning. This appears to mean that no market should be established within a third of a day's journey of any one who is already within a third of a day's journey of the established market, so as to give him the option of going to either: that is, the two markets must be at least ⅔ of 20 miles apart, which being further described as 6⅔ leagues, shows that the leuca is two miles. This quotation is important, as establishing the meaning which the old law writers attached to the word.

It may then, we think, be confidently asserted, that the league, which began as a mile and a half (Roman), soon became lengthened, until it remained fixed at two of the miles of the day. It appears also that this length of two miles was a settled league at so early a period, that it is the measure of our oldest law writers, and of most of the oldest charters. It depends therefore upon the mile of the thirteenth and fourteenth centuries; and we must refer to the article MILE for the discussion of its absolute length. In order that matters of computation very nearly related may not be separated, we refer to that article some independent evidence on the length of the league, which makes no mention of the mile. We shall finish this article by stating our conviction that the length of the league or leuca was, in the time of the old law writers, very near, one way or the other, to two modern statute miles and nine-tenths of a mile; the old mile being to the modern statute mile in the proportion of 45 to 100.

LEAGUE. [GUISE, DUKES OF.]

LEAKE, ADMIRAL SIR JOHN, born at Rotherhithe in 1656, was bred to the sea, and from 1677, when he fought in Sir E. Spragge's action with Van Tromp, to the end of the century, served with high credit in various stations; more especially he distinguished himself in the battle of La Hogue. Being in command on the Spanish coast during the War of the Succession, he obtained much honour by the skill and gallantry which he displayed in relieving Gibraltar, first in October, 1704, secondly in

* The reading in Hesychius is, Λεύγη, μέτρον τι γάλακτος. We do not know who made the correction Γαλατικόν, but this word or Γαλάταις is probably the right reading.

March, 1705. In the same year he bore an active part in the reduction of Barcelona, which again he relieved in April, 1706, when besieged by the Spaniards and French, and in great extremity. In the same year he commanded the fleet at the capturing of Alicant, Carthagena, and the island of Majorca, and in 1708 of Sardinia and Minorca. After the death of Sir Cloudesley Shovel in 1707, Sir John Leake was made commander-in-chief of the fleet, and in 1709 Rear-Admiral of Great Britain, on which occasion the queen paid him the high compliment that 'she was put in mind of it by the voice of the people.' In the same year he became a lord of the Admiralty, and continued high in office until the death of Queen Anne. Being superseded on a pension on the accession of George I., he spent the rest of his life in retirement, and died August 1, 1720, leaving a high professional reputation for skill, courage, prudence, and success. His private character is represented in a very amiable light. (See the 'Life' by his grandson S. M. Leake, 1750, and a long article in the 'Biographical Dictionary,' 8vo.)

LEAMINGTON. [WARWICKSHIRE.]

LEAP YEAR, the name given to every fourth year of the Julian calendar, in which one additional day (a twenty-ninth day of February) is reckoned. This correction constitutes the distinction of the Julian calendar: the necessity for the Gregorian correction arises from the years being made a very little too long, one with another, by making them consist of 365¼ days each, as is done when a day is added to each fourth year. The Gregorian correction is made by omitting three leap years in four centuries, and it is settled that the common years, which would otherwise be leap years, shall be those which terminate centuries in which the first pair of figures is not divisible by four. Thus the years 1800 and 1900 are not leap years, but 2000 is leap year: 2100, 2200, 2300 are not leap years, but 2400 is leap year.

LEASE, *Dimissio*, or *Demissio* (from the French *laisser*, *permittere*), is a demise or letting of lands or tenements, right of common, rent, or any hereditament, unto another for term of years or life, for a rent reserved. (Cowel's *Law Dictionary*, art. 'Lease.') But it should be observed that the 'reservation of a rent' is no necessary part of the definition. The party letting is called the lessor, and the party to whom the property is let is called the lessee. A lease has also been defined to be a contract between a lessor and a lessee for the possession and profits of lands and tenements on the one side, and a recompense by rent or other consideration on the other. (Bac., *Ab.*, tit. 'Lease.') The lessor who thus grants a term of years to a lessee out of some larger estate has a reversion to which the rent is incident, and which gives him a right to distrain, by virtue of the relation thus created, provided a fixed rent be reserved: fealty also is due from the lessee to the lessor. [DISTRESS.]

The lessor contracts to give the lessee the possession of the lands and premises, and accordingly the lessee in possession may maintain an action of trespass against a person who enters even the subsoil of his premises; as for instance, if such trespasser enters by means of a level or passage from a mine in adjacent premises, and takes coal from under the lessee's land. (*Lewis* v. *Braithwaite*, 2 B. and Ad., 437.) The possession of the lessee comprises all that the lessor is entitled to, which in the case of land extends indefinitely below the surface [LAND]: this possession may exist without any property or ownership, as in the case just stated.

A lease for years does not require a deed or livery of seisin, and at the common law no writing was necessary, although the entry of the lessee was requisite to give it complete effect; but now, by the Statute of Frauds (29 Car. II., c. iii., s. 1), all leases, estates, interests of freehold or terms of years, created by livery and seisin only, or by parol, and not put in writing and signed by the parties so making or creating the same, or their agents thereunto lawfully authorised by writing, shall have the force and effect of leases or estates at will only, except leases not exceeding the term of three years from the making thereof, upon which the rent reserved to the landlord during such term shall amount to two-thirds at the least of the full improved value of the the thing demised. If the tenement is incorporeal or a reversion or remainder, a deed is necessary, and other leases are commonly made by deed, as covenants can be made by deed only. (See *Bird* v. *Higginson*, 2 A. and E., and the cases there cited.) In leases for life livery of seisin or some substitute for it is necessary.

When there is a parol agreement for a lease, which would be void by the statute, but the tenant has entered in consequence of such agreement, and done other acts in part performance of it, courts of equity will decree that the landlord shall execute a lease according to the terms of such agreement, if it can be satisfactorily proved by evidence.

It has been laid down that whatever words are sufficient to explain the intention of the parties, 'that the one shall divest himself of the possession, and the other come into it for such a determinate time, such words, whether they are in the form of a licence, covenant, or agreement, are of themselves sufficient, and will, in construction of law, amount to a lease for years, as effectually as if the most proper and pertinent words had been made use of for that purpose: and, on the contrary, if the most proper and authentic form of words whereby to describe and pass a present lease for years are made use of, yet if upon the whole deed there appears no such intent, but that they are only preparatory and relative to a future lease to be made, the law will rather do violence to the words than break through the intent of the parties; for a lease for years being no other than a contract for the possession and profits of land on the one side, and a recompense of rent or other income on the other, if the words made use of are sufficient to prove such a contract, in what form soever they are introduced, or however variously applicable, the law calls in the intent of the parties, and models and governs the words accordingly.' (Bac., *Ab.*, tit. 'Lease,' K.) However, the words 'grant,' 'demise,' and 'to farm let' (which are commonly all used together), are the most proper operative words to constitute a lease for years.

For the reasons stated in the passage just quoted, it is frequently found difficult to decide whether an informal written instrument shall have the operation of a lease, or shall be considered only as an agreement for a future lease. Much of the litigation on the subject of leases has arisen out of this difficulty. 'When a person agrees to let premises for a term, it is not unusual for the intended assignee to be let into possession on executing an agreement for a lease, either as a temporary arrangement until a lease can be executed, or with a view of avoiding the expense* of a lease altogether. But such a course is strongly to be deprecated, on account of the various questions which have arisen in regard to the ascertained time and execution of such agreements, and the unsatisfactory state in which it places the rights and remedies of the respective parties. The tenant has no security for his possession, since he is liable to eviction in an action at law (*Hamerton* v. *Stead*, 3 Barn. & Cress., 478); nor has the owner any summary means of enforcing payment of his rent; for it is settled that, under such an agreement, no distress can be levied, the landlord's only remedy for his rent being an action for use and occupation (*Hegan* v. *Jackson*, 2 Taunt., 148; *Dunk* v. *Hunter*, 5 Barn. & Ald., 322; and see 3 Barn. & 4 Cress., 480): unless indeed rent has actually been paid under the agreement; in which case, as the payment of rent creates an actual tenancy from year to year between the parties, the landlord may distrain. (4 Bythewood's *Conveyancing*, by Jarman, 331.)

The editor then enters into an examination of the two classes of cases, namely, those in which instruments of the nature of agreements for leases have been held to amount to actual leases, and those in which they have been decided to be agreements only. All that can be done here is to state briefly the general conclusion at which he arrives from this examination.

'A comparison,' he says, 'of these two classes of cases will serve to show the impossibility of reconciling all the decisions upon the subject. The sound and sensible rule seems to be, that where the paper is executory in its terms, and contains no words of present demise, particularly where an intention to execute a lease is expressed, it is to be construed as an agreement only; and to this rule the later judges have certainly inclined. Much of the discrepancy in the determinations is produced by the cases of *Poole* v. *Bentley* and *Doe* v. *Groves*, in which, it will be remembered, Lord Ellenborough and the rest of the Court of King's Bench held that an instrument by which one party agreed to let, and the other to take, premises on certain

* Besides other differences between the two in regard to expense, there is a difference between the stamp duties chargeable on leases and agreements.

terms, and grant and accept a lease, operated as an actual lease, with an agreement to execute a future lease, by way of further assurance. The *professed* principle indeed of these cases is not at variance with the general current of authorities; for his lordship assumed that the instruments contained words of present demise; and if such had been the fact, the case of *Barry* v. *Nugent* would clearly have authorised his lordship's conclusion. But the assumption seems to be wholly unfounded; no operative words of demise can be collected from the instrument; therefore the cases may be considered as overruled by the later determinations, which seem to support the doctrine, as ably laid down by Sir James Mansfield in *Morgan* v. *Bissell*, except perhaps so far as the learned chief-justice asserted that words of present demise might be controlled by an agreement to grant a future lease; for it is difficult to carry the rule to this extent consistently with the principle in the authorities, particularly with the case of *Barry* v. *Nugent*.' (4 Bythewood, by Jarman, 341.)

The following is part of the doctrine of Sir James Mansfield above referred to:—'It would be a very wise rule, that whenever one person is about to grant and another to take a lease, until the lease was actually executed, no interest at law should pass. As to the question, What are usual covenants? it is an endless source of litigation. I have known parties long hung up at an inquiry before a master of chancery—What are the usual covenants? and it is the extreme of folly either to give or to take possession under such an agreement till a lease is executed; but the convenience of parties sometimes requires it.' (*Morgan d. Dowding* v. *Bissell*, 3 Taunt., 65.)

Every lease must contain a sufficient degree of certainty as to its beginning, continuance, and ending. But it may be made to determine, before the time fixed, by a proviso or condition. In most modern leases there is a proviso, that if the rent is not paid within a certain time, and no sufficient distress is found on the premises, the lessor may re-enter. Where the lease is made to begin from an impossible date, as the 30th of February, it will take effect from its delivery.

A lease for years may be made to commence at a future time. If the lease is made at common law, of lands in possession, the lessor's interest is not completed till he takes possession, for without having taken possession he cannot avail himself of all the rights and privileges of a lessee. But before he takes possession he has an interest, technically called an *interesse termini*, which he may release, assign, or bequeath; but this interest is not capable of enlargement by release. If it is a lease of the reversion, and the lease is made by deed, such lease gives a vested interest and passes a portion of that reversion to the lessee, who thus stands in the relation of landlord to a prior lessee; but a reversionary lease, or a grant of a lease, to commence on a future day, or on some given event, is only an interesse termini.

When a lease is made by deed, there are certain covenants implied between the parties in the words usually employed. Thus the words 'grant or demise' imply a covenant by the lessor that he has a right to create the term, and that the lessee shall have quiet enjoyment of the property demised. And the words 'yielding and paying,' in the usual reservation of rent, imply a covenant on the part of the lessee that he will pay the rent in the manner mentioned in the reservation. But the implied covenants are restrained by the expressed covenants, of which many are commonly inserted in formal leases, and which vary in their character according to the intention of the parties and the nature of the property demised.

The doctrine of Estoppels applies to leases for years. If a person execute a lease of lands, for any term by *indenture*, in which he has no estate whatever, the want of which estate does not appear upon the instrument, the lease will operate upon any interest which he may afterwards acquire in the same lands during the continuance of the term. To produce this effect an indenture is necessary, that the deed, being the act of both parties, may render the estoppels reciprocal. (Burton *On Real Property*, 850; see note (*b*), *Bullen* v. *Mills*, 4 Nev. & Man., 29.)

The assurance by which the whole term created by a lease is transferred to another is called an assignment, and by this transfer the assignee becomes liable, until he assigns to some other person, to all those covenants in the lease which are said to run with the land, that is to say, those covenants which are not personal and extrinsic to the lease. But where the property is transferred for a part of the original term only, the transfer is called an under-lease, and the under-lessee is not liable to the original lessor. [ASSIGNMENT; ASSIGNEE.]

It is not necessary, in order to make the assignee liable to the covenants, that he should have taken possession of the lands or premises assigned: it is enough, for this purpose, that he has acquired all the interest in the term of years. It is now also settled that a mortgagee who takes a legal assignment of a term is bound by the covenants even if he has never taken possession of the land or premises, or received rent; and the rule has been extended so far as to make an equitable mortgagee by deposit of the title-deeds also liable in equity to the covenants. (*Williams* v. *Bosanquet*, 1 Brod. & Bing., 238; 7 Sim., 149.) The practical inference to be deduced from these rules is, that a man should not take an equitable mortgage of a term of years by deposit of title deeds, nor an assignment of the whole term, if he wishes to avoid the liability to the covenants; but he should take an under-lease.

A condition may be annexed to a term of years in its creation in two ways: either to operate only if enforced by the entry of the lessor or his representatives; or to make the lease determine at once on performance or breach of the condition itself, without any additional ceremony. 'Conditions annexed to a chattel are more favoured by the law than those which tend to defeat a freehold estate. A particular alienation may be prohibited on pain of forfeiture. But then the original limitation must not be to the lessee and his *assigns*, for this would be a contradiction. By the common law, covenants between the lessor and the lessee relating to the land would in general run with it on both sides; but the benefit of a condition was entirely lost by alienation of the reversion. This inconvenience was remedied by stat. 32 Henry VIII., c. 34, which attaches both the benefit and the obligation of conditions as well as covenants to the reversion in the hands of a grantee or assignee. But still the benefit of a condition or covenant which is already broken, and requires to be enforced by entry or action, cannot be assigned; nor can that of a forfeiture actually committed by the illegal alienation of the lessee.' (Burton's *Law of Real Property*, 851-857.)

LEASE and RELEASE. Of the various kinds of releases an account must be deferred to the article RELEASE. For the present purpose it will be sufficient to state that the release here spoken of is the relinquishment of some right or benefit to a person who has already some interest in a tenement, and such interest as qualifies him for receiving or availing himself of the right or benefit so relinquished. (Burton's *Law of Real Property*, 45.) Before the passing of the Statute of Uses 'it appears that a lease for two or three years was sometimes made, and perfected by entry of the lessee, for the single purpose of his afterwards receiving a release of the reversion. Thus arose a sort of compound conveyance, called a lease and release, which, if the grantor were seised in fee simple, had the same effect as a feoffment.' (*Ibid.*, 62.)

When it had been determined that the Statute of Uses operated so as to give an estate in land without entry, a lease for a year by bargain and sale was made by the vendor to the purchaser. A use was thus raised to the bargainee, without any enrolment, which in the case of freehold interests was required by the statute of enrolments; and the use thus raised or created for the bargainee was converted, by the Statute of Uses, into a legal estate. Thus the bargainee became immediately capable of accepting a release of the freehold and reversion: and a release was accordingly made to him, dated the day next after the day of the date of the bargain and sale. The release made to a purchaser who has an estate by virtue of the bargain and sale may either be a release at common law as referred to in the passage just quoted, or it may be a release under the Statute of Uses, which is now always meant when we speak of the conveyance called a lease and release.

This conveyance is said to have been first contrived by Sergeant Moore, at the request of Lord Norris, in order that some of his kindred should not know, by any search of public records, what settlement he should make of his estate. The validity of it was formerly doubted. But it was resolved (18 Jac. I.) by the chief-justices Montague and Howard, and chief-baron Tanfield, that upon a deed of bargain and sale for years of land, though the bargainee never entered, if afterwards the bargainor makes a grant of

the reversion, reciting the lease, to divers uses, it was a good conveyance of the reversion. (*Lutwich* v. *Mitton*, Cro. Ja., 604.) And in a subsequent case, where there was a bargain and sale for years, followed by a release, judgment was given,—'that the lease being within the Statute of Uses, there was no need of an actual entry to make the lessee capable of the release; for, by virtue of the statute, he shall be adjudged to be in actual possession.' (*Barker* v. *Keate*, 2 Mod., 249.)

Lease and release is now the most common assurance for the transfer of freehold estates.

'In a lease and release, the lease is most properly made by the words "bargain and sell" only, that all possibility of question as to the mode of its operation may be excluded: but the release has commonly a multitude of words, such as "grant, bargain, sell, alien, release, and confirm;" the variation of which according to circumstances is for the most part more a matter of taste than of importance: and where the consideration is not pecuniary, the idle words "bargain and sell" are countenanced by the insertion of a nominal consideration, as of ten shillings, acknowledged to be paid.' (Burton *On Real Property*, 541, 542.)

When the conveyance by lease and release became a common assurance, only a nominal consideration was mentioned in the bargain and sale; and it was held that even a reservation of a pepper-corn rent was a sufficient consideration to raise a use by a bargain and sale on which to found a release.

'The recital of a lease for a year, in a deed of release, is good evidence of such lease against the releasor and all claiming under him (but not against strangers), without proving that there was such a deed, and that it was lost or destroyed. Not only estates in possession, but estates in remainder and reversion may be conveyed by lease and release. Estates in remainder and reversion expectant on estates for lives may be conveyed by lease and release; but in cases of this kind it is inaccurate to say that the releasee is in the actual possession of the premises; the proper expression being, that they are actually vested in him by virtue of the bargain and sale, and the operation of the Statute of Uses. Incorporeal hereditaments, such as advowsons, tithes, rents, &c., may be conveyed by lease and release, for they are expressly named in the Statute of Uses, or comprised under the general word hereditaments.' (4 Cru. *Dig.*, 114, 115.)

Lease and Release is one of those which are technically called the *innocent* conveyances, in contradistinction to those which are termed *tortious*. Thus,

'A conveyance by lease and release does not divest any estate, or create a discontinuance or forfeiture. Thus Littleton says,—"By force of a release nothing shall pass but the right which he may lawfully and rightfully release, without hurt or damage to other persons, who shall have right therein, after his decease." And in a subsequent section he says,—"If tenant-in-tail lets the land to another for term of years, by force whereof the lessee hath possession, and the tenant-in-tail release all his right in the same land, to hold to the lessee and his heirs for ever, this is no discontinuance: but after the decease of the tenant-in-tail, his issue may enter; for by such release nothing passed but for time of the life of the tenant-in-tail." This conveyance will not, for the same reason, destroy a contingent remainder: therefore if a person is tenant for life, with a contingent remainder depending on his estate, and he conveys in fee by lease and release, the contingent remainder will not be destroyed.' (4 Cru. *Dig.*, 116.)

The various modes in which property in land can be settled by means of lease and release belong more particularly to the subjects of POWERS and USES.

LEAST SQUARES, METHOD OF. This is a method, which, since its first introduction, has been shown to be the method of finding the most probable truth, when a number of discordant observations have been made upon a phenomenon. The earliest attempt at anything of the sort was made by Cotes, in a tract entitled 'Estimatio Errorum in mixta mathesi,' in which he very distinctly recommends a process which is identical with that of the method of least squares. It is remarkable that Cotes proposes his theorem not merely as a mode of finding a convenient mean (as was done by Legendre and Gauss), but as giving positively the most probable result. He even introduces the hypothesis of observations having different weights (though not with perfect correctness), and comes as near as possible to the assertion afterwards proved by Laplace. It will be worth while to quote the passage, as follows:—'Mihi vix quidquam ulterius desiderari videatur postquam ostensum fuerit quâ ratione Probabilitas maxima in his rebus haberi possit, ubi diversæ observationes, in eundem finem institutæ, paullulum diversas ab invicem conclusiones exhibent. Id autem fiet ad modum sequentis exempli. Sit p, locus objecti alicujus ex observatione primâ definitus, q, r, s, ejusdem objecti loca ex observationibus subsequentibus; sint insuper P, Q, R, S, pondera reciprocè proportionalia spatiis evagationum, per quæ se diffundere possint Errores ex observationibus singulis prodeuntes, quæque dantur ex datis errorum limitibus; et ad puncta p, q, r, s, intelligantur pondera P, Q, R, S, et inveniatur eorum gravitatis centrum Z: dico punctum Z fore locum objecti maximè probabilem qui pro vero ejus loco tutissimè haberi potest.'

Legendre, in his work on comets (1806), first distinctly proposed the application of the method to any case, and Gauss afterwards stated that he had been in the habit of using it since 1795. Finally, Laplace, in his 'Theory of Probabilities' (1814), and we believe in a previous paper published in the 'Memoirs of the Academy of Sciences,' showed that this method was in all cases the one which the principles of that theory pointed out as giving the result, which, from the observations, has the greatest weight of probability in its favour. The details and demonstration of this method may be found in the work of Laplace cited, in the Berlin 'Astronomisches Jahrbuch,' for 1834 and the two following years, and in the treatise on Probabilities in the 'Encyclopædia Metropolitana.'

The most simple case of this method has been in use as long as accurate observations have been made, under the name of taking an average or a mean. If three observations give 93, 94, and 98, then the mean of the three is 95, and if this be assumed as true, it is also assumed that the errors of the observations were 2, 1, and 3. The sum of the squares of these is $4 + 1 + 9$, or 14, and this is the least possible sum which can be thus obtained. If for example, we assume anything but 95, say 95·1, the assumed errors are then 2·1, 1·1 and 2·9, the squares of which are 4·41, 1·21, and 8·41, the sum of which is 14·03, more than 14.

But the more extended cases of the method of least squares are those in which the result is not simply observed, but is to be determined by operations upon the results of observation. In all cases the rule is the same; namely, that result has the greatest probability in its favour, the assumption of which makes the sum of the squares of the errors the least possible, provided that all the observations are equally worthy of confidence. Without entering into further explanation, we shall give the results of one case.

Suppose that A and a are to be determined by observation, the required result being $A \div a$ or the solution of the equation $a\,x = A$. Suppose also, which is essential to the simple form of the method which we now give, that all the observations, both of A and a, are made under equally favourable circumstances. Say that four observations are made of each; those for a being p, q, r, and s: those for A being P, Q, R, and S. If then all the observations were perfectly correct, each of the equations $p\,x = P$, $q\,x = Q$, $r\,x = R$, $s\,x = S$, would be identical with $a\,x = A$. Supposing however that the observations are discordant, take what value of x we may, the several quantities $p\,x - P$, $q\,x - Q$, $r\,x - R$, $s\,x - S$, will not be (as they should be) each equal to nothing. Whatever their value may be, the whole of each value will be error: and the sum of the squares of the errors, or

$$(p\,x - P)^2 + (q\,x - Q)^2 + (r\,x - R)^2 + (s\,x - S)^2$$

must be made the least possible. The value of x which satisfies this condition is

$$\frac{P\,p + Q\,q + R\,r + S\,s}{p^2 + q^2 + r^2 + s^2}$$

which is the most probable value.

The method of least squares is now universally used in astronomy, which is perhaps the only science in which so delicate a test is absolutely necessary.

LEATHER (*cuir*, French; *leder*, German; *leer*, Dutch; *læder*, Danish; *läder*, Swedish; *cuojo*, Italian; *cuero*, Spanish; *kusha*, Russian). This substance, which is universally employed throughout the civilized world, is prepared from the skins of animals, or it would perhaps be more correct to say, consists of that substance after it has been chemically changed by the process of tanning. This

change is effected by means of a substance residing in several vegetable matters, to which the name of *tannin* has been given. When this tannin, which is soluble in water, is applied to the hides of animals from which the hair, epidermis, and any fleshy or fatty parts adhering to them are removed, and which hides then consist wholly of *gelatin*, also soluble in water, these two soluble substances so unite chemically as to form the wholly insoluble substance called leather. [TANNING.]

The leather manufacture is one of great importance in this kingdom, giving employment in all its various branches to a very great number of persons. It has been computed that taking into the account tanners, curriers, and dressers, shoemakers, glove-makers, harness-makers, sadlers, and other branches of the leather manufacture, there cannot be fewer than 250,000 persons supported by this branch of industry. We have not at present any means for ascertaining the quantity of leather made in the United Kingdom. The yearly average production in the three years ending with 1822 was 48,244,026 pounds; the average production in the next three years was 63,051,096 pounds, being an increase of 30 per cent. This increase is in great part attributable to the reduction of the duty from 3*d.* to 1½*d.* per pound, which took place in 1822. In 1830 the duty was wholly repealed, and we have thenceforward no means for ascertaining the quantity produced yearly. It is reasonable to suppose that the repeal of the duty, joined to the increase of the population, has since caused at least as great an increase in this branch of manufacture as followed the reduction of the duty in 1822. In this case the annual production at this time will be 82,000,000 pounds, and the value, taking one quality with another, at the moderate price of 1*s.* 4*d.* per pound, will amount to 5,466,000*l.* It has been assumed that the value of the leather forms only one-third of the cost of the articles made with that material, at which calculation the ultimate value of the manufacture in this country must be 16,400,000*l.* Some persons have calculated that the value of the leather—the raw material—forms only one-fourth part of the aggregate value of leather goods, and the manufacture must, according to their calculation, exceed 21 millions per annum. Nor will this amount appear excessive if we consider that there is only a very small proportion of the people, however poor they may be, who do not wear leather shoes or boots; that the use of leather gloves is general among all but the labouring class; and that the harness of horses used for pleasure, as well as those used for agricultural and other business operations, is made with this material, besides an endless variety of things in daily use, which will suggest themselves to every one's mind.

Nearly the whole of the leather made in this kingdom, and of the articles made with it, is used at home. The quantity and declared value of leather, wrought and unwrought, and the declared value of sadlery and harness, exported (almost wholly to our colonies and dependencies), in each of the ten years from 1828 to 1837, were as follows:—

	Leather wrought and unwrought. Number of Pounds.	Leather wrought and unwrought. Declared Value.	Sadlery and Harness. Declared Value.
1828	1,321,542	273,976	89,600
1829	1,338,987	268,380	83,303
1830	1,495,003	257,130	78,321
1831	1,314,931	246,410	61,312
1832	1,407,729	244,393	52,583
1833	1,652,579	279,524	60,013
1834	1,617,421	248,302	63,095
1835	2,104,318	285,934	74,462
1836	2,042,471	322,546	94,059
1837	1,647,000	255,818	87,938

The duty on leather, which was necessarily charged upon the weight produced, was impolitic, because of the regulations enforced by the revenue-officers for the prevention of fraud, but which also prevented the introduction of improved methods of manufacture; and it was also unequal in its pressure, falling most heavily upon those who were least able to bear it. The shoes of the labouring man were necessarily made thicker and heavier, and therefore paid a greater amount of duty than shoes worn by the easy classes, on which ground alone it was important to repeal it, but there is every reason for believing that the improvement in the quality of leather brought about since that repeal is of far greater benefit to all classes than the simple amount of the duty.

The revenue derived from this manufacture in the ten years preceding the repeal of the duty was—

1820	£608,158	1825	£443,000
1821	600,282	1826	378,975
1822	546,503*	1827	393,516
1823	393,657	1828	414,863
1824	434,481	1829	396,207

LEAVEN. [BREAD.]

LEBADÆA, LIVADIA. [BŒOTIA.]

LEBANON. [SYRIA.]

LE BLANC. [BLANC, LE.]

LEBRUN (or LE BRUN), CHARLES, an eminent French painter, was born at Paris in 1619. His father was an indifferent sculptor. The son, manifesting an early talent for drawing, was placed under the care of Simon Vouet. He however went to finish his studies at Rome, where he spent six years, during which time he diligently applied himself, under the guidance of Poussin, to acquire a thorough knowledge of the antique, and of the works of Raphael and other great masters. Lebrun had a very comprehensive genius, improved by profound study of history and of the manners of different nations. Few painters were better acquainted with the human mind and the influence of the passions on the countenance, as is shown in his 'Traité sur la Physionomie,' and 'Sur le Caractère des Passions.' In invention he has had few superiors. With a lively imagination he combined great facility of execution and sound judgment, and aimed at the greatest correctness, especially in the costume and details. His colouring, particularly in the flesh, is indifferent, retaining too much of the school of Vouet; his light and shade are often not happily distributed, and his foregrounds are generally deficient in force. His great merit obtained him the favor of Louis XIV., who appointed him his principal painter, president of the newly-erected Academy of Painting and Sculpture, and director of the Gobelin manufactory, conferred on him the order of St. Michael, and frequently visited his studio while he was engaged on the battles of Alexander, the best-known and most admired of all his works, even the engravings from which give a high idea of his great abilities, and of the elevated style of his composition and design. Lebrun died at Paris in 1690, at the age of seventy-one.

LECCE, a town in the kingdom of Naples, in the province of Terra di Otranto, which is often styled also 'provincia di Lecce,' because Lecce is the residence of the Intendente of the province and of the courts of justice. Lecce is a bishop's see, and one of the best built and liveliest towns in the kingdom, with wide streets, a handsome market-place, several fine churches, a royal college, and 15,000 inhabitants. Considerable trade is carried on here in agricultural products of the country, the principal of which are oil, tobacco, wool, cotton, and gum. There are also manufactories of lace.

The people of Lecce have a reputation for shrewdness and talent, and many of the natives have distinguished themselves in the learned professions. Lecce is situated about 200 miles east of Naples, and nine miles from the Adriatic coast, in a plain on the north-east side of the range of hills which cross the Messapian peninsula in its entire length. A good road, 25 miles long, leads from Lecce across the peninsula to Gallipoli on the southern coast, and another road, lately finished, leads to Taranto, from which Lecce lies 45 miles east. It is about 20 miles south-east of Brindisi, and nearly the same distance north-west of Otranto.

LECTOURE. [GERS.]

LECYTHIDA'CEÆ, an important but small natural order of plants with singular fruits, and very large fleshy flowers, inhabiting the woods of South America. They are regarded by De Candolle as a section of Myrtaceæ, from which they differ in their leaves being alternate, and not dotted, the stamens monadelphous, and extended on one side, in an unusual manner, into a broad lobe, which covers over the centre of the flower like a hood.

Among the plants belonging to this order are the following, which deserve particular notice.

1. *Lecythis ollaria*, a tree inhabiting the forests of Cumana and Brazil, with a hard woody fruit as large as a child's head, and opening by a lid like that of a jar or urn. It contains numerous large seeds.

2. *Lecythis Zapucajo*, a large Guiana tree, with alternate oval leaves twelve inches long, and racemes of large fleshy red and white flowers. The fruit is hard, woody, urn-shaped, and about four inches broad by six inches high; it

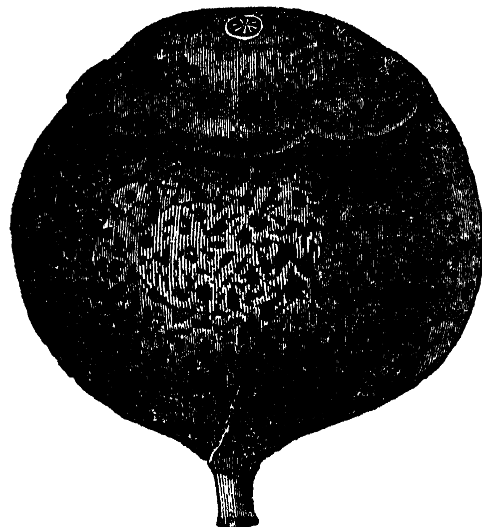
* Duty reduced from 3*d.* to 1½*d.* per lb. from 5th of July in this year.

contains numerous seeds as large as almonds, and quite as agreeable when fresh. They are sometimes seen in the fruiterers' shops in London, where they are called *Sapucaya nuts*.

3. *Bertholletia excelsa*, already described. [BERTHOLLETIA.]

4. *Couroupita guianensis*, or Cannon-ball tree. This plant takes its name from its large heavy woody fruit, which, according to Aublet, is about the size of a 36-pound shot, and although urn-shaped like the others, does not open by its lid, but is broken by its fall, or lies on the ground till it rots, before the seeds can extricate themselves. The flowers are very large and handsome, deep rose colour and white; the tree is of great size, with a trunk often more than two feet in diameter





Flower and fruit of the Couroupita guianensis, or Cannon-ball tree.

LEDBURY. [HEREFORDSHIRE.]

LEDOUX, CLAUDE NICOLAS, born at Dormans, in the department of the Marne, in 1736, quitted the college of Beauvais at the age of fifteen, and went to Paris, where he at first gained his livelihood by engraving; but an irresistible inclination led him to the study of architecture, with the principles of which he made himself acquainted in Blondel's 'Cours.' His prepossessing person and engaging address availed him for some time more than his talents, or rather procured for him opportunities of displaying the latter; and he knew so well how to turn them to account, that Madame Dubarry appointed him her architect in 1771. It was for her that he erected the elegant pavilion De Louveciennes, and the Château de St. Vrin, near Arpajon. His high favour in that quarter not only established his celebrity with the public, but immediately procured for him numerous commissions, both in the capital and the provinces. In the former he built an hotel for Count d'Halleville; in the rue Michel le Comte, that of the Prince de Montmorency; and, besides several others, the Hôtel Thelusson, remarkable for the vast bridge-like gateway towards the street. In the latter he built the Château de Benonville, near Caen. But it was the 'Barrières' of Paris that afforded him an opportunity of abandoning himself to his fancy; and considering the period of their erection, they certainly display considerable originality, yet very much that is questionable; and have for the most part the appearance of being merely first ideas and sketches, carried at once into execution without having been revised and matured. The same remark applies to the large folio volume he published, consisting of a treatise on architecture, illustrated by designs, which, though they display much originality, are not a little chimerical and extravagant. He died of a paralytic attack, November 19th, 1806, at the age of seventy.

LEDYARD, JOHN, a remarkable person in the history of geographical discovery, was born at Groton in Connecticut, and educated at Dartmouth College, New Hampshire. Having lost his father, and being apparently friendless, he had not the means, if he had the wish, to follow up his studies. Some years he spent among the Indians, a good school of preparation for his future toils. He worked his passage from New York to London in 1771 as a common sailor; and in 1776 sailed with Capt. Cook, on his third voyage, in quality of corporal of marines. While thus engaged he conceived the bold scheme of traversing the unknown regions of America, from the neighbourhood of Nootka Sound to the eastern coast; and so earnest was he, that being frustrated in his design of reaching the western shore of America by sea, he set out from England towards the end of 1786, with ten guineas in his pocket, hoping to reach Kamtchatka, and thence effect a passage to America. According to Tucker's 'Life of Jefferson,' this scheme was suggested to Ledyard by Mr. Jefferson, then the American minister at Paris, who assisted him with money. He traversed Denmark and Sweden, passed round the head of the Gulf of Bothnia, after an unsuccessful attempt to cross it on the ice, and reached St. Petersburg in March, 1787, without money, shoes, or stockings, having gone this immense distance on foot in an Arctic winter. At St. Petersburg he obtained notice, money to the amount of twenty guineas, and permission to accompany a convoy of stores to Yakutsk in Siberia. But for some unexplained reason he was arrested there in January, 1788, by the order of the Empress Catherine, while waiting for the spring, and conveyed to the frontier of Poland, with a hint that he would be hanged if he re-entered Russia. He found his way back to England, after suffering great hardship. Still his adventurous spirit was unbroken; and, almost without resting, he eagerly closed with the proposal of the Association for promoting the discovery of the inland parts of Africa, to undertake a journey into that region. There is a characteristic story, that on being asked how soon he could be ready to set out, he replied, 'To-morrow morning.' He left London, June 30, 1788; and travelling by Marseille and Alexandria, reached Cairo, Aug. 19. The ardent, persevering, intelligent spirit of inquiry shown in his first and only despatches raised high expectation of the value of his labours; but these were cut short by his premature death, in that city, of a bilious disorder. His route was to have been from Sennaar westward, in the supposed direction of the Niger, so that he would have crossed that great continent in its widest part, traversing Bornou and the region lately explored by Denham and Clapperton, at right angles to their track from the Mediterranean. From his scanty education and mode of travelling, Ledyard probably would have contributed little to scientific knowledge; but his vigour and endurance, mental and bodily, and indifference

to pain, hardship, and fatigue, fitted him admirably for a geographical pioneer; and his death, the first of many lives sacrificed to African discovery, excited a strong feeling of regret. 'I have known,' he said, shortly before leaving England for the last time, 'hunger and nakedness to the utmost extremity of human suffering. I have known what it is to have food given as charity to a madman; and I have at times been obliged to shelter myself under the miseries of that character, to avoid a heavier calamity. My distresses have been greater than I have ever owned, or ever will own, to any man. Such evils are terrible to bear, but they never yet had power to turn me from my purpose.'

LEE, NATHANIEL, was born in the latter part of the 17th century. He was educated at Westminster school, and afterwards went to Trinity College, Cambridge. A passion for the theatre led him to appear as an actor on the London stage, but he met with no success. He wrote however thirteen tragedies, of which two, 'Alexander the Great,' and 'Theodosius,' remained favourites for a long time, though the first alone is now remembered. A derangement of mind led to Lee's temporary confinement in Bedlam, and though he was released, he did not long enjoy his liberty. He died at the age of thirty-four, having, as Cibber supposes, been killed in a night ramble.

Lee has been treated with too much leniency by contemporary critics, who have admitted the bombast that pervades his works, but ascribe it to a wild and powerful imagination. Now it seems that these critics have mistaken his inflated words and thoughts for the fruits of imagination, when they are merely common-places dressed up in extravagant language. Shelley may be called a poet of wild imagination, because he is carried on by an irresistible impulse to creation of images, so rapid, that the theme of the poem is often lost. On the other hand, a poet of regulated imagination is one who, also with a creative power, has his creations at his own command, and uses them to illustrate his main subject. But extreme exaggeration may arise without much imagination; it requires no more imagination to describe a pillar 2000 than two feet above its proper height, or a multiplication table would be the imagination's highest creation. On looking over 'Alexander the Great,' it will be found that it is this sort of arithmetical exaggeration that is so freely used; thus, a character in sorrow will command 'all the world' to weep, and so on. The author has thus brought together a number of impossible characters, uttering no single word of true feeling, nor a phrase in good taste; and a discriminating reader will not only feel no interest, but find it difficult to repress a smile at the woes of the gaudy heroes and heroines. Much less would have been ascribed by the critics to the strength of imagination, had the connection between the words 'imagination' and 'image' been kept in mind; a connection which, in the German language, is preserved between 'bild' and 'einbildungskraft.'

LEECHES (Zoology), Hirudinidæ, a family of annulose animals, or red-blooded worms of Cuvier, which forms the fourth order of the Annelida in the work of MM. Andouin and Milne Edwards, the most recent publication on the classification of these animals. This order, called *Annelida suctoria* [ANNELIDA], is characterized by the body of the animals being destitute of bristles for locomotion, completely apodous, without soft appendages, and furnished with a prehensile cavity in the form of a sucker at each extremity. The head is not distinct, but generally provided with eyes and jaws. Cuvier, in the 'Règne Animal,' places the leeches in the third order of the Annelida, the '*Abranches*,' and in the second family, the '*Abranches sans soies*.' The classification of MM. Andouin and Milne Edwards does not differ materially from that of Cuvier, or from that in the 'Système des Annélides,' by Savigny, published in the great work on Egypt.

The family of the Hirudinidæ comprehends not only the leeches properly so called, which live by sucking the blood of various animals, but also includes many other worms which derive their nourishment in a totally different way, and present corresponding differences in organization. The affinities between the hirudines and some of the setiferous annelidans, as various species of nereis, lumbricus, planaria, &c., are so close that they hardly admit of being arranged in separate orders, and others of the leech tribe may even be confounded with some species of lernææ or epizoa.

The antients appear to have only known the most common species of leech: Aristotle makes no mention of them, and they do not appear to have been used in medicine in the time of Hippocrates. Pliny describes them very clearly under the name of Hirudines and Sanguisugæ, and distinguishes two species. The sea-leech is distinctly mentioned by Belon, Rondelet, and by all the writers on natural history since the revival of letters. More recently Linnæus increased our knowledge of the number of species, of which he describes eight in the 12th edition of the 'Systema Naturæ.' Müller afterwards discovered five or six others, so that Gmelin, in his edition of the 'Systema Naturæ,' enumerated fourteen species. Since then, Shaw, Leach, Dutrochet, Savigny, Milne Edwards, &c., have found many more, and the introduction of new zoological methods has caused a necessity for arranging these various species in different genera, of which we shall enumerate those which are best known.

The true leeches are all destitute of branchiæ or special organs of respiration, and this function has been supposed to be effected by means of the skin generally, but Dr. M. Edwards has recently stated (as was before observed by Cuvier) that 'there exists in these annelida a series of small membranous sacs, each of which communicates externally by a minute orifice situated on the ventral aspect of the body: these sacs derive from the numerous vessels which ramify upon their parietes a considerable quantity of blood; water penetrates into these organs, and seems to subserve a true respiratory purpose.' But though the species of the family Hirudinidæ are not provided with distinct branchiæ, these organs are found in a genus which is generally associated with the true leeches, and which we will place first in the following list of genera:—

1. Branchellion (*Savigny*), Branchiobdella (*de Blainville*), Polydora (*Oken*). These names have been given to a worm closely resembling a leech in external structure (it being furnished with two suckers), which is found parasitic on the Torpedo in the Mediterranean and other seas. The Hirudo branchiata (*Menzies*), a species observed on the tortoise which is found in the Pacific ocean, has also been placed in this genus, though Cuvier says that it ought not to be associated with it.

Hirudinidæ *proper*.

Section I.—Anterior sucker separated from the body by a distinct strangulation or neck.

2. Albione (*Sav.*), Pontobdella (*Leach* and *Blain.*), characterized by the body being bristled over with tubercles: species all marine; seven have been enumerated; two of them are very common in our seas:—1. Albione verrucosa, Hirudo muricata (*Linnæus*); 2. Pontobdella spinulosa (*Leach*): both of these worms attach themselves to fish, particularly skates; and the latter species is commonly known to fishermen by the name of the skate-sucker.

3. Hæmocharis (*Sav.*), Ichthyobdella (*Blain.*). In this genus there are eight eyes, the body is narrow, and the jaws scarcely visible. The only known species is the Hæmocharis piscium, Hirudo piscium (*Lin.*), which lives in fresh waters, where it attaches itself to fish, particularly Cyprini.

Section II.—Anterior sucker very slightly separated from the body.

4. Geobdella (*Blain.*), Trochetia (*Dutrochet*), is distinguished by having an enlargement round the orifices of the genital organs. We only know one small species of this genus, the Geobdella trochetii, which inhabits our waters, and which frequently comes on land to pursue the lumbrici or earth-worms.

5. Pseudobdella (*Blain.*) has the mouth merely provided with folds of skin, and is destitute of teeth. Only one species is well known, the Pseudobdella nigra, Hirudo nigra (*Lin.*), the common black leech.

6. Hæmopis (*Sav.*), Hypobdella (*Blain.*), has the mouth furnished with a few obtuse teeth. Three species are enumerated; the best known is the Hæmopis sanguisorba (*Sav.*), Hirudo sanguisuga (*Lin.*), the common horse-leech, which is much larger than the medicinal leech, and wholly of a greenish-black colour. The horse-leech has been reported to inflict dangerous wounds by some observers, while others say that it never attacks vertebrate animals. M. De Blainville thinks that this discrepancy has arisen from this species having been confounded with the foregoing, the black leech, which cannot penetrate the skin of vertebrate animals for want of teeth. Both these leeches greedily attack the common earth-worm.

7. Sanguisuga (*Sav.*), Jatrobdella (*Blain.*). The anterior

sucker has its upper lip divided into several segments. Its aperture is transverse, and it contains three jaws, each of which is armed on its edge with two ranges of very fine teeth, which enable these leeches to penetrate through the skin without making any dangerous wound. This genus contains the true medicinal leeches, eight species of which have been enumerated: the most common is the Sanguisuga medicinalis, Hirudo medicinalis (*Lin.*), which is a native of all our stagnant fresh waters.

8. Bdella (*Sav.*) has eight eyes and is destitute of teeth: one species is found in the Nile—the Bdella nilotica.

9. Nephelis (*Sav.*), Erpobdella (*Blain.*), has eight eyes, and the mouth is furnished internally with only three folds of skin. Several species of this genus are enumerated; the most common is the Nephelis tessilata (*Sav.*), Hirudo vulgaris (*Lin.*). This species has often been confounded with the medicinal and other leeches; it is commonly found in fresh waters, and, like all the other species of this genus, never leaves the water, and is injured by the contact of the air; so that if taken out of the water it quickly dies.

Section III.—Anterior sucker wanting.

10. Clepsina (*Sav.*), Glossopora (*Johnson*), Glossobdella (*Blain.*). This genus has a widened body and only a posterior sucker; the mouth is in the form of a proboscis. Cuvier thinks it doubtful whether the species of this genus should be arranged with the leech family; they consist of little worms which never leave the water, and live fixed to the stem of aquatic plants, from which they perhaps derive their nourishment: they never swim, but crawl along.

Besides the genera which we have enumerated, several parasitic worms, which live always fixed to the same part of some animal, have been enumerated among the Hirudinidæ, and have been arranged by Blainville in the genus Epibdella. He also places several other species, which are without distinct articulations, in the genus Malacobdella. There still remain several doubtful species of leech, and some have been confounded with true Planariæ, which differ from leeches in having no sucker at either end.

LEECHES, MEDICAL USE OF. Of the species described in the preceding article it is intended to treat here only of those of the genus Sanguisuga (Savigny), as they only can be employed for medical purposes. The same reason induces us to confine our attention to the species S. officinalis (Savigny) and S. medicinalis (Savigny).

Though the S. obscura and S. interrupta might be employed to withdraw blood, yet the S. officinalis and S. medicinalis are chiefly so used. The former is also termed the Hungarian or green leech (Hirudo provincialis of Carena; S. meridionalis of Risso), while the latter is termed the German or brown, or grey leech, also the true English or specked leech. The one species abounds in the south of Europe, while the other is a native of the north. The S. medicinalis is now rare in England, owing to the draining of so many of the ponds and bogs in which it formerly abounded. The same is nearly the case in France, which used to be supplied chiefly from the district of La Brenne, but now from the frontiers of Russia and Turkey. England derives the immense number required mostly from Sweden, Poland, and Hungary.

The genus Sanguisuga is characterized by having the body elongated, the back convex, the belly flat, and the oral and caudal extremities narrowed, before they spread out into disks or suckers. The body consists of from ninety to one hundred or more soft rings, which do not increase in number, but only in size, with the age of the animal, which requires about eight years to come to maturity; and if it escape being devoured by others which prey upon it, it may attain twenty years. The anterior or oral extremity is rather narrower than the caudal: it is provided with ten blackish points or eyes, and a triradiate (not triangular) mouth, furnished with three cartilaginous jaws, each armed with numerous cutting-teeth. The anus is very small, situate on the dorsal surface of the last ring.

The S. officinalis has a green body or light blackish-green, the back marked with six longitudinal bands of an iron colour, spotted with black spots at their middle portion and edge. The belly is of a yellowish-green *without spots*, but broadly bordered with black. The segments of the body are very smooth. It is large, often seven inches long. It lives in pools and rivers. There are three varieties.

S. medicinalis has the body of a deep green, its back marked with six longitudinal bands of an iron colour, pretty clear, spotted with black points, generally triangular. The belly is greenish, *spotted*, and broadly bordered with black, and the segments of the body rough from granular eminences. It inhabits ponds and small lakes.

Of the anatomy of the leech it is not necessary to say much. The skin consists of two layers, the external or epidermis, and the internal or corium. The first is transparent, resembling a serous membrane: this is thrown off from the body every four or five days. The corium consists of condensed cellular tissue. It displays the divisions into rings, and in it resides the colouring matter of the leech.

The alimentary system consists of the mouth, the stomach, salivary glands, liver, and anus. The mouth has a triradiate figure, formed of three equidistant lines, meeting in a centre, about the middle of the oral disk. Inside are three sublenticular jaws or piercers, white, and of a cartilaginous appearance. On the free, curved, sharp margin of each jaw there are about sixty small fine-pointed teeth The alimentary canal consists of an œsophagus, a long stomach, with cœcal sacs, and an intestine. The œsophagus is a muscular tube, and commences between the inner angle of the three jaws by a roundish opening: it dilates as it approaches the stomach, but at its termination it contracts into a circular aperture: the whole length does not exceed a quarter of an inch. The stomach occupies two-thirds of the length of the animal, and is formed of eleven compartments or cells. Each of these divisions, i.e. from the second to the eleventh, gives off on each side a sac, of which those of the last cell are much the largest. The intestine is about an inch in length; at the upper orifice is a valve, and at its lower a sphincter. These organs can contain nearly half an ounce of blood; so that there is nothing remarkable in the statement that leeches have been known to exist three years in water, without any other nourishment than they could obtain from it; for the blood is received into cells quite distinct, in the first eight of which it remains for months, without undergoing any change either in colour or fluidity: over these cells the animal has a perfect control, merely allowing so much nutriment to pass into the alimentary canal as is necessary to preserve its existence. This accounts for the reluctance of the animal, after being used to abstract blood, to repeat the operation; it not only being gorged at the time, but provided with nutriment sufficient to serve it during almost a sixth portion of its life. In its native abode the true medicinal leech does not seem to take any solid aliment, but subsists on the fluids of fish, frogs, &c.

Leeches are oviparous. The ova remain in the uterus for some time, where they become invested first with a serous membrane, and then with a glutinous fluid, which remains attached to them after their expulsion, and serves as a protecting covering after they are deposited in the clay and holes of the sides of the ponds. The leeches generally deposit the *cocoons* from May to the end of September. It would seem that these animals do not multiply in great abundance unless they have tasted blood, particularly that of cows. On this account the leech-dealers of Bretagne drive horses and cows into the ponds to such an extent that the cattle of the district are in general wretched-looking, and the leech-gatherers not much better.

About five years are required before the leach attains a state of maturity; while very young they are quite unfit for medical purposes. They are caught in various ways, by the hand, or by a person wading in the shallow waters during the spring of the year, when they adhere to his naked legs; but in summer, as they have retired to deeper waters, a raft is constructed of twigs and rushes, by which a few are entangled. Baits are deposited, generally pieces of decayed animal matter or liver, to which the leeches resort, and are then caught; but this last method is thought to injure the health of the animal. Many sicken and die on the journey, especially during warm weather. They are conveyed either in bags or small barrels with a canvas cover.

Leeches are subject to many diseases, several of which are epidemic, and spread in the troughs with great rapidity. On the first appearance of illness the sick should be immediately separated from the healthy. Care should be at all times taken that different speeches of leeches be not associated in the same trough, for they prey upon each other. The Hæmopsis vorax and also H. nigra devour greedily the S. medicinalis or S. vulgaris, though they cannot penetrate the skin of vertebrated animals.

A leech may be known to be in good health if it be active in the water and plump when taken out. In Prussia

leeches are divided into three classes, according to their weight: the first not exceeding thirty grains; the second weighing between thirty and sixty grains; the third from sixty to ninety. Leeches above ninety grains are not to be used, unless specially ordered. In each prescription the physician is required to state what description of leech he intends should be used. In the case of children such regulations are highly proper, as an excess of blood abstracted may easily produce serious and often fatal consequences. Leeches vary in the quantity they can abstract, from one drachm to half an ounce: from one to two drachms is the average. The quantity is often doubled by the expedients resorted to after the leech has been removed, either dry or wet clothes being applied, or in many cases cupping-glasses, but cataplasms of linseed-meal are most beneficial where they can be applied.

One grey or German leech is deemed equivalent to two green or Hungarian leeches. The cases requiring or justifying the application of leeches are stated under the respective diseases, and need not be repeated here. It is of more importance to indicate the proper mode of applying them. The leech, though not so accurate an index of the weather as is commonly believed, is yet sensible of atmospheric changes, and in some (probably peculiarly electric) conditions of the atmosphere cannot be induced to bite. In such cases time ought not to be wasted, nor the patient exposed injuriously or kept in a fatiguing position, but some other mode of blood-letting should be had recourse to. Moreover, if the leech be sickly, it can rarely be made to bite. Certain states of the patient also hinder or indispose them to bite. Where the skin is very thick they cannot puncture it, or if the person has been using sulphur, the exhalation of the sulphuretted hydrogen is disagreeable to them; even the fumes of tobacco, vinegar, &c. will prevent them biting; also if grease, salt, or vinegar be on the spot to which they are applied, they refuse to attach themselves to it. The existence of hairs on the spot seems to hinder them from biting, and also from forming a vacuum to suck up the fluid, on which account they should be carefully shaved off. The leeches should be taken out of the water, and allowed to creep for some time over a dry warm cloth: in the meanwhile the part where it is intended to apply them should be washed with *plain* (not perfumed) soap and water, then with water alone, afterwards with milk or porter. It is difficult to make them fix themselves on the particular spot wished; but a leech-glass will generally effect this, and is preferable to holding the leech in the hand. When they still refuse to bite, slightly puncturing the part with any sharp instrument, so as to cause a little blood to ooze out, is a useful expedient: or if we pluck a feather from the wing of any bird, and cutting off the end, allow the liquid contained in it to be dropped on the spot, the leech will bite readily.

When the leech has dropped off, it should be seized by the tail or caudal end, and striped between the finger and thumb, so as to cause it to disgorge most of the blood. It is proper to allow it to retain a third of the blood. This is preferable to applying salt or vinegar to the mouth. It should then be placed in many successive fresh waters, and it may perhaps survive, and after many months be again fit for use.

When no expedient is had recourse to, in order to maintain the flow of blood, it generally stops spontaneously; but in some cases it continues much longer than is proper. Where the blood is either deficient in coagulating power, as happens in many weak persons, or when it is in a very alkalescent state, and the albumen in too dilute a condition, or owing to the very vascular state of the skin of children, the hæmorrhage is often troublesome, and in the case of children, who do not bear well the loss of a large quantity of blood, sometimes fatal. The object of any remedial means is to form a coagulum, or plug, at the mouth of the bleeding vessels. A weak solution of creosote applied to the part will generally effect this, or felt scraped from a hat, or gum in powder, or flour, or the dust of the puff-ball (lycoperdon or bovista), or the application of a compress and bandage, tying a ligature, or touching the wounds with lunar caustic. The patient should at the same time drink a saturated solution of alum, or take dilute sulphuric acid out of very cold water.

The increasing scarcity of leeches renders their preservation and propagation objects of primary importance. The death of a vast number of leeches is occasioned by errors in the method of keeping them. Though aquatic animals, it is not enough that they be supplied with water. They breathe by their entire surface, and are accustomed to change their skin every four or five days. Their body is covered, like that of all animals and plants which inhabit the water, by a slimy or mucilaginous fluid, which not only enables them to glide through the water, but keeps an aërial stratum in close contact with their respiring surface. When present in a limited degree, this mucous secretion is highly serviceable to them; in excess it is destructive. It is impossible for them to diminish it when it has accumulated, or to denude themselves entirely of their old skin, in water only. They must have some resisting body to creep over or through in order to accomplish this object. Some leech-dealers keep clay at the bottom of the troughs, and though this is useful as a material in which the leeches can burrow in warm weather (by which they are always more injured than by cold, if not intense; and it is their habit to retreat to the deeper waters of their native rivers or ponds in summer), it is inadequate to the end. The best method seems the following recommended by Fee:—

Into a marble or stone trough a layer of seven inches of a mixture of moss, turf, and charcoal of wood is to be put, and some small pebbles placed above it; at one extremity of the trough, and midway between the bottom and the top, place a thin plate of marble pierced with numerous small holes, upon which there should rest a stratum of moss or portions of the equisetum palustre, or horse-tail, firmly compressed by a stratum of pebbles. The trough to be replenished with water only so high that the moss and pebbles should be but slightly moistened. A cloth is to be kept over the mouth of the trough. This is imitating as near as possible their natural condition, and the charcoal not only aids in keeping the water sweet, but appears to prevent the leeches being attacked by parasitic animals, to which they are very liable. The water should be changed about once a week, and more frequently in warm weather.

Leeches have not been observed to propagate when kept in small bodies of water, but in large reservoirs, having a border of turf and rushes, and the sides well furnished with clay, in which to deposit the cocoons, Dr. Noble of Versailles has succeeded in procuring young ones. It has also been ascertained in France that leeches which have been used, if restored to their natural haunts, propagate abundantly, and also become capable of being again applied after eight or twelve months' stay in these congenial quarters.

The great extent to which the trade in leeches is carried on renders attention to this subject of paramount importance. Four only of the principal dealers in London import 7,200,000 annually, and in Paris 3,000,000 are used.

Leeches have sometimes been swallowed; and in Syria and other places a small leech is sometimes drank with the waters of the pools, and by adhering to the throat causes great suffering. Salt or vinegar is the best means of dislodging them.

(Johnson *On the Medicinal Leech;* Brandt and Ratzeburg, *Getreue Darstellung der Thiere;* and Mr. Pereira's Lectures in *Medical Gazette.*

LEEDS, the principal emporium of the woollen manufactures, is the most populous borough and market-town in Yorkshire; its parish is co-extensive with the borough. It is situated in the West Riding, in the liberty of the honour of Pontefract, and in the wapentakes of Skyrack and Morley. Under the Reform Act it sends two members to parliament. Its population in 1831 was 123,393, and the number of 10*l.* houses 6683. Under the Municipal Act, the borough has a commission of the peace, is divided into 12 wards, has 16 aldermen, and 48 councillors. It is 186 miles north-north-west of London; 40 miles north-east of Manchester, 33 miles north of Sheffield, and 24 miles south-west of York.

The township of Leeds comprises 3050 acres, and a population of 71,602 persons; the out-townships of the parish are Armley, Beeston, Bramley, Chapel-Allerton, Farnley, Headingley with Burley, Holbeck, Hunslet, Potternewton, and Wortley, which comprise 21,766 acres and a population of 51,791. The hamlets of Coldcotes, Osmondthorpe, Skelton, and Thornes, which lie at the west end of the borough, are comprehended in it; they are in the parish of Whitkirk, but from time immemorial they have been ecclesiastically included in the parish of Leeds.

History.—It is highly probable that Leeds was a Roman

[illegible] by Roman remains have been found in various parts of the town. The great road from Tadcaster (Calcaria) to Manchester (Mancunium) passed through this place. The district was successively under the dominion of the Romans and the sea-kings, or pirates, from Scandinavia and the Baltic. The North-men effected the subjugation of the [illegible] about the year [illegible], and it was again conquered by the Saxons previous to the Norman Conquest. The remains of a Danish fortification near Armley, and various other remains, both Danish and Saxon, sufficiently attest the above circumstances.

The appellation *Loidis* (Leeds) is Saxon; derived either from *Lod*, a people, or *Lodi*, the name of the first Saxon possessor. Nothing is known of the place in Saxon times, except that streets existed on the site of some of the present streets. It is mentioned in 'Domesday Book' (see p. 127, Bawdwen's translation), from which notice it appears rather to have been an agricultural than a manufacturing district. Soon after the Conquest Leeds passed, together with other valuable northern possessions, into the hands of the De Lacies. [BRADFORD; PONTEFRACT.] The castle of the Paganells, who held the place under the De Lacies, was besieged by Stephen. After the Paganells, the manor was held by several successive lords; it then reverted to the crown, and was afterwards purchased by a body of individuals, and has since passed into the hands of successive proprietors, who hold their court-leet, and are vested with the usual manorial privileges. We learn from Leland that in his time Leeds was considerably less than Wakefield, and Lord Clarendon (in 1642) speaking of Leeds, Halifax, and Bradford, calls them 'three very populous and rich towns depending wholly upon clothiers.' Perhaps no very definite time can be named as the commencement of manufactures at Leeds, but we may judge from the efforts made about the commencement of the sixteenth century for the various accommodations required by an increasing population, that such efforts were immediately subsequent to the commencement of its manufacturing activity. In 1638 Leeds had to furnish its proportion of ship-money; the town also participated in the conflict between Charles and the parliament,—it suffered under several severe visitations of the plague,—and in 1644-5 more than one-fifth of its population perished. At this time the place was almost deserted, the markets were removed to a distance from the town, and grass grew in the streets. The first charter was granted by Charles I.; the second, by Charles II., was granted on the petition of the merchants, cloth-workers, and other inhabitants, to protect them from the great abuses, defects, and deceits discovered and practised by fraudulent persons in the making, selling, and dyeing of woollen cloths. This charter also granted the usual municipal powers and privileges. The funds of the corporate body were never great. Of late years the town has continued to improve rapidly, and it possesses all the local establishments requisite for a large commercial community, as well as the institutions and societies necessary for supplying the wants and advancing the interests of its labouring population. In 1808 W. Hutton, the antiquary, passed through the town, and after witnessing its internal elements of wealth, and its natural advantages, he remarks of it, 'Leeds is rising, and will continue to rise except checked by a *just and necessary war*. The river, having been made navigable, gives an easy access to the markets. The number of elegant buildings recently erected shows what they have been able to accomplish; but the enterprising spirit of the inhabitants will perform future wonders. Good fortune stamps the place her own.'

Situation and Inland Communication.—Leeds is situated on the slope and partly on the summit of a hill which rises from the north bank of the Aire, and from the top declines to the east, west, and north. The northern and southern parts are connected by a freestone bridge, over which the traffic is very great. Two suspension bridges erected over the river, the first in 1827, and the second in 1832, form a connection between the town and its most populous suburbs. They are of a novel and simple construction. Instead of chains, the usual mode of suspension, two strong cast-iron arcs span over the whole space between the two abutments. The suspending arch is 1[illegible] feet wide, spanning over the river Aire and the towing-path; there is besides a small land arch of stone on each side. The total length of one of these bridges is [illegible]0 feet, and the span of the suspending arch 112 feet; the width of the bridge is [illegible] feet. The dimensions of the other bridge are rather less. The Victoria Bridge, from Sandford Street to the canal dock, is the property of a company of proprietors, with a capital of 20,000*l.* Its arch is 80 feet span, and 45 feet broad within the battlements: the first stone was laid in May, 1837. Leeds is admirably situated for trade, being placed in the heart of the inland navigation of the county. It communicates with the eastern seas by means of the Aire and Calder Navigation to the Humber, and westward by the Leeds and Liverpool Canal with the Mersey. The warehouses of the Aire and Calder Company are of great dimensions, and suited to the immense traffic to which they are auxiliary. A second communication to the east is formed by the Leeds and Selby Railway, which has now been in successful operation several years, and to which a line of continuation is in progress to Hull. A similar means of communication westward will soon exist in the line of railway now in the course of formation between Leeds and Manchester. Indeed, it is evident that Leeds will shortly be the great northern centre of these rapid modes of transit; for the North Midland Railway will proceed from Leeds directly southward, and be connected with the main line to London; while the York and North Midland will proceed northwards and connect Leeds, York, Newcastle, and Edinburgh.

Manufactures.—The principal manufacture of Leeds is woollen cloth. There are a few worsted spinners and manufacturers, but the chief seats of the worsted trade are Halifax and Bradford. Twenty years ago there were in the clothing district extending westward from Leeds, and even to the confines of Lancashire, nearly 6000 master clothiers, who employed, besides their wives and children, 30,000 or 40,000 persons. But the number of these small domestic manufacturers has diminished exceedingly, in consequence of the introduction and extension of the factory system. Still there are immense numbers of clothing hamlets and villages where the first stages of the operations are carried on, as spinning, weaving, and fulling. The clothiers are generally men of small capital, who have a little farm or some other occupation independent of their manufacturing operations. The introduction of machinery during the present century has caused the erection of extensive factories, in which the whole process, from the breaking of the wool to the finishing of the cloth for the consumer, is carried forward. (MacCulloch's *Statistical Account of the British Empire*, vol. ii., p. 57.) Till within the last thirty years Yorkshire produced only the coarser kinds of cloth. The present improved qualities of its goods are the result of the skill and perseverance of Mr. William Hirst, himself an humble manufacturer, who introduced such improvements as enable Yorkshire to enter into competition with the superfine qualities of the West of England cloths. Though the spinning of worsted and the manufacture of worsted stuffs is not extensively followed at Leeds, vast quantities of these goods are brought there to be dyed and finished; these are chiefly purchased in the undyed state at Bradford and Halifax. [BRADFORD; HALIFAX.] The localities of the woollen and worsted manufactures in Yorkshire are—for woollen cloth, Leeds and Huddersfield; for worsted stuffs, Bradford and Halifax; and for blankets and carpets, Dewsbury and Heckmondwike. (MacCulloch's *Statistical Account of the British Empire*, vol. ii., pp. 50, 51.) The dye-houses and dressing-shops at Leeds are very extensive. In these establishments both the woollen and worsted goods are finished after being purchased in the rough, at the cloth-halls and piece-halls of the towns named. The mills at Leeds for the spinning of flax for canvas, linen, sacking, thread, &c., are very extensive; there are also large manufactories of glass and earthenware. These and the other operations of the district are facilitated by the abundant supply of coal, produced from the mines in the vicinity of the town. The number of steam-engines employed is at present estimated at 300, with an aggregate power of 5500 horses.

The Cloth-Halls.—The largest but at the same time the plainest buildings in Leeds are the cloth-halls. The Coloured-Cloth Hall was built in 1758; the White-Cloth Hall in 1775. Previous to 1711 the cloth-market was held in an open street; a hall was then built, which was used till 1755, but it was abandoned when the present buildings were erected. In the cloth-halls, the principal sales of woollen cloths in their rough state from the country manufacturers to the merchants are effected. The Coloured-Cloth Hall is a quadrangular building, 127½

yards long and 66 broad, divided into six departments, which are called streets. Each street contains two rows of stands, and each stand measures 22 inches in front, and is inscribed with the name of the clothier to whom it belongs. The original cost of each stand was 3*l.* 3*s.*; this price advanced to as much as 24*l.* at the beginning of the present century, but it has now fallen even below its original value; not owing to any decrease in the quantity of manufactured goods, but to the greater prevalence of the factory system over the domestic system of manufacturing. An additional story erected on the north side of the Coloured-Cloth Hall is used chiefly for the sale of ladies' cloths in their undyed state. The White-Cloth Hall is nearly as large as the Coloured-Cloth Hall, and is built on the same plan; the price of its stands has undergone similar fluctuations to those of the other, arising from the same cause. The markets for mixed and white cloths are held on Tuesdays and Saturdays, on which days only the merchants are permitted to buy in the halls. The time of sale is the forenoon, and commences by the ringing of a bell, when each manufacturer is at his stand, the merchants go in, and the sales commence. At the end of an hour the bell warns the buyers and sellers that the market is about to close, and in another quarter of an hour the bell rings a third time, and the business of the day is terminated. Fines are exacted from all who continue in the hall after this time. The White-Cloth Hall opens immediately after the other is closed, and the transactions are carried forward under similar regulations. The cloth is brought to the halls in the unfinished state, and it is dressed under the direction of the merchants.

Markets, Police, &c.—The Commercial Buildings may be considered as an Exchange for the merchants. The form is a parallelogram, with the south-western corner rounded. This portion is formed into a spacious portico, which has considerable architectural beauty. The entire edifice is of stone. Until 1823, the markets of Leeds were held chiefly in streets and thoroughfares, to the great annoyance of residents and passengers. At present the various markets are exceedingly commodious, and equal to the supply of all the wants of the dense population. The Free Market occupies an area of 9758 square yards; the Central Market is a spacious covered building, and is one of the principal ornaments of the town. It has a handsome elevation in the Grecian style. It was erected by a company of shareholders, and cost 35,000*l.* The area is divided into three walks, with stalls. The streets or alleys round the market are occupied chiefly by butchers. The South Market was also erected by a body of proprietors: it is chiefly used for the leather fairs, of which eight are held annually. The Corn Exchange is one of the ornaments of the town. The chief features of its elevation are two Ionic columns in antis, which support an entablature and pediment, and a small bell turret is raised above the whole. Between the columns is a niche with a statue of Queen Anne, which was restored at the expense of the corporation, and removed from the antient moot-hall to its present situation. The corn market is held every Tuesday, between the hours of eleven and one. The banks of Leeds are numerous, and have always offered those facilities so needful to the prosperity of a commercial town. The court-house, under which is the prison and police office, was completed in 1813. In it the quarter-sessions and the petty sessions for the borough are held. The Michaelmas sessions for the West Riding are also held here. The gaol affords no opportunity for the classification of prisoners, and has only a small airing-yard. A new borough gaol is however contemplated. The cavalry barracks are just within the northern boundary of the township. The buildings and the parade ground occupy more than eleven acres of land. This establishment was provided by the government, at a cost of about 28,000*l.*, granted in 1819 and 1820. The workhouse is a large and well-conducted establishment, now under the control of a board of twenty guardians. The present management is in no degree inferior, as regards the comforts of its inmates, to what it was towards the close of the last century, when it was visited by Howard, and called forth his commendations. The other establishments connected with the municipal and general police of the town are the water-works, the gas-works, and the fire-engine establishments. Water-works have existed in the town since 1694. In 1784 further measures were taken to supply the increasing wants of the population. In 1790 efforts were again made, but all these have been insufficient, and at the present time the water is not only indifferent in quality, but in quantity is only equal to about one-[illegible] of the demand. An act was however obtained in [illegible], and works are in progress which seem to promise a full supply. The town was badly and partially lighted with oil lamps to 1822, in which year it was lighted with gas. A new company was formed in 1834, and from the competition consequent on the existence of two gas companies it is now very efficiently lighted. The town contains good public baths. The building has a neat elevation, adorned with Ionic columns and pilasters. There is also a capacious swimming-bath adjoining the Leeds and Liverpool Canal. The fire-engine establishments in various parts of the town are well kept up, and are in every respect creditable to the insurance companies. The savings' bank has a large number of depositors, and the provident institutions are numerous and well sustained; they take the usual forms of benefit societies, annuity societies, and widows' fund societies. The places of public amusement are the theatre (a plain building), which is not much encouraged, the assembly-rooms, and the music-hall, the latter of which is now used for various public purposes. An elegantly proportioned concert-room and a well appointed news-room are provided in the Commercial Buildings. The temperance societies in Leeds have accomplished a great moral change in the habits of many of the industrious classes. The late establishment of a day police has been attended with the effect of ridding the borough of disorderly persons.

Charitable Institutions, Trusts, &c.—The Leeds Infirmary was established in 1767, since which time great additions have been made to it, and it now possesses accommodations for more than 150 in-patients. This institution is secured from the too near proximity of other buildings by the purchase and presentation of 4000 square yards of building-ground, by R. Fountayne Wilson, Esq. To the same gentleman Leeds is indebted for other munificent acts. The subscriptions and collections in support of the Infirmary amount to about 2500*l.* annually; the rest of the income is derived from legacies and benefactions, from the dividends of 3000*l.* stock, and from certain shares. The number of in-patients who participated in the benefits of the infirmary in 1835 was 1608, and of out-patients 2904. The House of Recovery, for the reception of persons attacked by infectious fevers, may be considered as an appendage to the Infirmary, and it is supported by similar means. Out of 179 patients who entered it in 1834, 137 were cured. The Dispensary relieves about 3000 patients per annum, at an expense of about 600*l.* The other medical charities in Leeds are the Eye and Ear Infirmary and the Lying-in Hospital.

Respecting the trusts in the hands of 'the Committee of Pious Uses,' nothing very satisfactory or definite is known, except to those who act as trustees. It is a subject of complaint that no correct list of the trustees is accessible to the public; neither is the nature of the property, its value, or its application thoroughly known. The Charity Commissioners obtained an inventory of the property about ten years ago, but it has altered much, both in amount and description, since that time. One of these trusts for the repair of highways in and near Leeds is of considerable amount, but the stock varies according to the assistance rendered by the committee to the different townships. There is also a trust for the poor, which is laid out in clothing, and distributed at Christmas. The estates of the free grammar-school are vested in the committee, and the property of several other charities. Harrison's hospital was endowed in 1653, and its funds have since been augmented by various bequests. Jenkinson's almshouses, founded with money bequeathed in 1643, provide a residence for eight poor and aged persons. Certain rents are also distributed by the will of the founder among the aged poor of Leeds. Several augmentations have been made to the funds of this charity by later bequests. Potter's hospital, endowed in 1729, provides for the reception of ten antient, virtuous, poor, necessitous widows; the income of this charity has also been increased by later endowments. The sources of [illegible] charity are considered to amount to more than 4,000*l.* a year. In addition to this amount upwards of [illegible]*l.* a year are distributed in the town and immediate neighbourhood for the support of local charities; and besides this large subscription for local institutions, the inhabitants of Leeds are among the most munificent contributors to the various county charities and institutions for the support or education of those who labour under

physical infirmities. The smaller charities of Leeds are the Benevolent Society, and the clothing, visiting, soup, and other charities. In every large town assistance of this nature is called for, either under circumstances of periodical and foreseen presence and difficulty, or for extraordinary and unlooked-for calamities.

Places of Worship.—The parish church, dedicated to St. Peter, is now (1839) being rebuilt upon its antient site. The late building is supposed to have been erected in the time of Edward III., and enlarged during the reigns of Henry VII. and VIII. The old vicarage-house was pulled down in 1823 to make room for the Free Market, when a large and handsome mansion was purchased in a very salubrious part of the town. The vicarage is worth upwards of 1800*l.* per annum. In consequence of the disorderly proceedings at a contested election for the office of vicar in 1748, the patronage was vested in twenty-five trustees. The vicarial tithes were commuted in 1823 for 500*l.* a year, arising from 14,000*l.*, one half of which was the gift of R. F. Wilson, Esq., and the other half was raised by subscription. St. John's church was erected and endowed at the sole cost of John Harrison, Esq. This benefice is a perpetual curacy, and is now worth 375*l.* per annum. Trinity church was built by subscription, and endowed by the Rev. Henry Robinson, the nephew of the above-named John Harrison, and whose charities were also very numerous. The other Episcopal places of worship in the town are St. Paul's, St. James's, Christchurch, St. Mary's, St. Mark's (the three latter built under the Million Act), and St. George's church; the last was erected in 1837, and the entire cost of the building and endowment was defrayed by subscriptions, amounting to more than 11,000*l.* The townships of Hunslet, Holbeck, Beeston, Armley, Wortley, Farnley, Headingley, Kirkstall, Bramley, and Chapel Allerton have also episcopal chapels, and most of them several dissenting places of worship. The Catholics have two chapels in Leeds, and have lately erected a most splendid structure, to which the name of 'St. Ann's Catholic Church' has been given. 'The interior of this church consists of a nave and side aisles; its inside dimensions are 100 feet 6 inches long by 58 feet 6 inches wide, and the outside extreme extent, including the tower, is 124 feet 6 inches. The tower and spire rise to the height of 150 feet. It is built in the style of architecture which prevailed during the fifteenth century. The accommodations in the body of the church are for 600 persons, with sufficient room for 200 other sittings to be fixed at a future period; and in the gallery, which is a front one, and very spacious, 200 sittings are provided.' (*Leeds Mercury, Oct.* 27, 1838.)

There are 32 dissenting chapels in Leeds The Wesleyans have six chapels, two of which are the largest and handsomest chapels in the kingdom, and each contains 3000 sittings. The Warrenites, a sect who have separated from the Wesleyans, have four chapels. The New Connexion Methodists have three chapels; the Primitive Methodists have two; the Female Revivalists have two. The Independents, a very numerous and influential body, have seven chapels, two of which are very costly in their accommodations. The Unitarians have two chapels, in one of which Dr. Priestley officiated during the earlier period of his ministry. The Baptists have two chapels. The Inghamites, a sect which originated at Leeds, and which approach in their faith to the moderate Calvinists, have one chapel. The Friends, the Swedenborgians, and the Southcottians have also each a place of worship.

In 1835 'the Leeds Cemetery' for the use of persons of all religious denominations was opened. It is situated near Woodhouse Moor, and occupies ten acres of land. The ground is laid out in walks and grassy lawns, and shaded with ornamental trees and shrubs. The same person is registrar and chaplain, and he and the sexton reside in houses adjoining to and forming part of the principal entrance. In the centre of the cemetery is an elegant chapel. The grounds afford space for 14,000 graves in addition to the vaults under the chapel, and an intended arcade to consist of a range of 40 spacious vaults, which may be subdivided to suit purchasers.

Schools and Scientific Institutions.—The free grammar-school of Leeds was first endowed by the Rev. Sir William Sheafield, in 1552, but it has received many subsequent endowments from various individuals. In 1624 John Harrison gave the present site, and the former edifice was erected at his expense. A dwelling-house for the head-master was built in 1780, and the school was rebuilt in 1823, on an enlarged plan. In 1815 the trustees adopted a resolution by which the pupils receive the benefit of instruction in the elementary branches of the mathematics. In 1820 they further determined that the sons of all residents in Leeds should be freely taught, and that the masters should receive no presents. This school enjoys one of Lady Elizabeth Hastings's scholarships, and it has also a claim, in its turn, to a fellowship and two scholarships at Emanuel College, Cambridge, in case they are not filled up from the free-school at Normanton. There are also three scholarships of 20*l.* per annum each, at Magdalen College, Cambridge, for scholars from Leeds, Halifax, and Heversham schools. The Charity Commissioners reported of this school that it was ably and satisfactorily conducted. The number of scholars is upwards of one hundred. The annual income of the school is more than 1600*l.*, and it possesses about 3000*l.* stock. Fines on copyhold estates form an occasional source of income. The masters are liberally remunerated.

St. John's charity-school, for the education and clothing of 80 girls, was established in 1705; it was originally intended for 40, and included their maintenance. In 1815 its object was again partially changed, and it was converted into an institution for bringing up girls of twelve years of age and upwards as household servants. The property of this charity produces about 400*l* per annum, and arises from 5900*l.* 3 per Cents, and various small investments. It is managed by subscribers who contribute one guinea a year.

The Lancasterian school for 500 boys was commenced in 1811. We ascertain from the last Report that 8776 pupils have been received since its commencement; that 350 were received in 1837; and 323 left in that year; 477 were in the school at the date of the last Report (1838). A library is formed for the use of the elder boys, and the elements of mathematical drawing are taught. The committee consider that a carefully conducted common education is given at an annual cost of six shillings each pupil. The school owes much of its present efficiency to the untiring labours of its constant visitor Mr. B. Goodman. There are several other Lancasterian schools in the town, and the Wesleyan Methodists have four large day-schools on a system in many respects similar. In the central school of the National Society there are 267 boys and 166 girls. The whole number of Church Sunday-schools, including this, contain 2038 boys and 2012 girls. The Sunday-schools in connexion with the Sunday-school Union contain 4619 pupils, who are taught by 749 teachers. There are also several other Sunday-schools, which are not included in either of the above bodies. The Leeds infants' school was established in 1826; the building at present occupied was erected in 1836; the school is intended as a model-school, and for the instruction of teachers.

The chief institutions at Leeds for supplementary education are the Leeds Philosophical and Literary Society, established in 1820, which has about 300 proprietary and ordinary members and annual subscribers; the Leeds Literary Institution, which has 500 members, and the Leeds Mechanics' Institute, which has 260 members. The Philosophical Society has an extensive museum, a laboratory, and a library, and it has published a highly interesting volume of Transactions. The Literary Institution has a large reading-room, an extensive library, frequent lectures, and a collection of philosophical apparatus. Connected with the Mechanics' Institute a peculiar feature requires notice. In 1837 thirteen of the Mechanics' Institutions of the West Riding were formed into a union, to embrace the following important objects:—1st, The interchange of opinion and advice on the local management of Mechanics' Institutes, and the consequent rapid diffusion of improved methods; and, 2nd, The procuring of first-rate lectures on scientific subjects, systematically arranged, and subordinated to each other, so as to present a connected and comprehensive view of each, at a much lower pecuniary cost than can be done by isolated engagements.' This plan of the union of several institutions was strongly recommended in the 'First Publication of the Central Society of Education;' it was brought forward at Leeds by Mr. Edward Baines; it has been found to answer as far as could be looked for during the first year of trial, and there can be no doubt but, with the modifications which time and experience will suggest, it will work well for all populous districts. There is a School of Medicine at Leeds, and a Society for the Encouragement of the Fine Arts which has periodical

exhibitions. The Leeds library, founded in 1768, on the recommendation of Dr. Priestley, is one of the most extensive in the north of England. There are also the New Subscription Library, the Eclectic Library, the Parochial Library, and the Young Men's Library.

A society has been formed during the last year for the establishment of Botanical and Zoological Gardens; they occupy about 20 acres of land, and are now rudely laid out, ponds have been dug and shrubs planted; the greenhouses and conservatories will be immediately erected.

Eminent Persons.—Ralph Thoresby, the author of 'Ducatus Leodensis;' Dr. John Berkenhout, William Hey, Esq., F.R.S., a surgeon of great celebrity, Dr. Bentley, John Smeaton, Sir Thomas Dennison, Bishop Wilson, the Rev. Joseph Milner and his brother Dr. Isaac Milner, Dr. Priestley, David Hartley, and Edward Fairfax, the translator of Tasso, were all born at Leeds, or in the immediate vicinity. John Harrison, the philanthropist, was also a native and a resident of Leeds, where his name will be always venerated, not only for his active charities but for the purity of his life.

(Thoresby's *Ducatus Leodensis*; Whitaker's *Loidis and Elmete*; Parsons's *History of Leeds, &c.*; Baines's *Directory of Yorkshire*; and *Communications from Leeds.*)

LEEK. [STAFFORDSHIRE.]

LEER (sometimes called Lier), a circle of the province of East Friesland in the kingdom of Hanover, with a population of 18,000 inhabitants. Leer, the capital, is a market town, situated in 53° 13′ N. lat. and 7° 25′ E. long., on the river Leda, which falls into the Ems about three-quarters of a mile below the town. It is an unfortified well built place; it has one Lutheran, one Calvinist, and one Roman Catholic church, a Moravian chapel, a synagogue, a grammar school, an orphan asylum, two hospitals, &c., and 6500 inhabitants, who carry on manufactures of linen, woollen, leather, thread, stockings, &c. There are 26 extensive brandy distilleries, 16 breweries, and some soap manufactories. Leer has a considerable trade in butter, cheese, and other articles: ships of 150 tons burden come up to the town by the Ems, and the number of vessels arriving and departing is from 250 to 300 in a year.

LEET is the precinct or district within the cognizance or subject to the jurisdiction of a court-leet. Sometimes the term is used to denote the court itself, the full style of which is 'court leet and view of frank-pledge.' Each of these titles is frequently used alone; but the omission does not affect the character or the jurisdiction of the court. The court-leet is also called a law-day, as being the ordinary tribunal.

I.—*Origin of the Court-leet.*

One of the least improbable derivations of the word 'leet' seems to be that which deduces lath and leet from the Anglo-Saxon 'lathian,' or 'gelathian,' to assemble, both lath and leet indicating, under different modifications, a district within which the free male resiants (residents) or indwellers assembled at stated times, as well for preparation for military defence as for purposes of police and criminal jurisdiction. Of the first of these objects scarcely any trace exists in the modern leet. The title of the court as a 'view of frank-pledge' points to its former importance under the extensive system of police introduced or perfected by King Alfred, which required that all freemen above twelve years of age should be received into a decenna, dizein, decennary, or tithing, sometimes called a visne, or neighbourhood, and in Yorkshire and other parts of the North, ten-men-tale (a number, tale, or *tally* of ten men), and forming a society of not less than ten fribergs or freeborrows, freemen, each of whom was to be *borhoe*, that is, pledge or security for the good conduct of the others. So the German 'bürge,' pledge or surety (fidejussor), appears to be derived from the verb 'borgen,' to give or take on credit. In this sense, in the 'Franklin's Tale,' Chaucer has 'Have here my faith to borw.' And in the 'Squire's Tale,'—'St. John to borwe.'

In the ballad of 'The Rising in the North,' preserved in Percy's 'Reliques of Antient Poetry,' Lady Northumberland, proposing to her husband to place herself in the hands of Queen Elizabeth, as a surety or hostage for his submission, says, 'Thy faithful borrow I will be.'

When a party was accused of a crime, his tithing was to produce him within 31 days, or pay the legal mulct for the offence, unless they proved on oath that no others of the tithing were implicated in the crime, and engaged to produce him as soon as he could be found. For great crimes the offender was expelled from the tithing, upon which he became an outlaw.

The duty of inspecting a decennary or tithing was called a view of frank-pledge, the freeborrows having received from their Norman conquerors the designation, well known in Normandy, of frank-pledges. The principal or eldest of these freeborrows, and as such the person first sworn, who was denominated sometimes the tithing-man or tithing-head, sometimes the headborough or chief pledge, sometimes the borsholder or borsalder (borhes-alder, or senior or ruler of the pledges), and sometimes the reeve, was in an especial manner responsible for the good conduct of each of his co-pledges, and appears to have had an authority analogous to that still exercised by the constable, an officer elected by the resiants for the preservation of the peace within the district constituting the leet, tithing, or constablewick. This officer is in many places called the headborough, which designation, as well as those of borsholder and tithing-man, is frequently used by the legislature as synonymous with that of constable. It is probable that all the frank-pledges were numbered according to rank or seniority, as in places where more than two constables are required, the third officer is called the thirdborough. Blackstone, misled by the sound, supposes headborough to be the chief person or head of a town or borough. This derivation will remind the readers of 'Hudibras' of the 'wooden bastile' (stocks), which

> 'None are able to break thorough,
> Until they're freed by *head of borough*.'

The Holkham MS. of the Anglo-Saxon customary law says:—'A tithing (there called decimatio) contains, according to local usage, ten, seventy, or eighty men, who are all bound (debent) to be pledges (fidejussores) for each other. So that if any of them be accused (calumpniam patitur), the rest must produce him in court, and if he deny the offence, he is to have lawful purgation by the tithing (*i.e.* by their swearing to their belief of his innocence). A tithing is in some places called a *ward*, as forming one society, subject to observation or inspection within a town or hundred. In some places it is called "borch," that is, pledges for the reasons above stated. In others it is called tithing (in the original, decimatio), because it ought to contain ten persons at the least.'

The assizes of Clarendon directed 'that all the customs of frank-pledge should be observed; that a person receiving men into his house or land, or within his jurisdiction (soke), who were not in frank-pledge, should be answerable for their appearance, and that no franchise or liberty [LIBERTY] should exclude the sheriff from entering for the purpose of seeing that views of frank-pledge were duly held.'

Leets are either public or private. The public leet is an assembly held in each of the larger divisions of a county, called a hundred, at which all freemen who are resiants within the hundred are bound to attend in person or by their representatives. These representatives were the reeves or chiefs of their respective tithings, whether designated by that or by any of the other appellations, each of whom was accompanied by four good and lawful men of, and elected by, the tithing which deputed them. This public court-leet was held formerly by the royal governor of the county, the ealdorman of the Saxons, the earl of the Danes, the comes or count of the Normans. This great functionary was accompanied by the shire-reeve, an officer elected by the county to collect the king's rents and the other branches of the royal revenue, who, in the absence of the ealdorman, presided in the court, and governed the county as his deputy, whence he is called by the Normans a vice-comes or vicount, though in English he retained the name of shire-reeve or sheriff, the designation connected with his original and more humble duties. This public court, which was originally called the folkmote, being held successively in each hundred in the course of a circuit performed by the sheriff, acquired the name of the sheriff's *tourn*, by which name, though itself a court-leet, it is now distinguished from inferior private leets. The latter courts appear to have been created at a very early period by grants from the crown obtained by the owners of extensive domains (which afterwards became manors [MANOR]), and most frequently by religious houses, for the purpose of relieving their tenants and those who resided upon their lands from the obligation of attending the tourn or leet of the hundred, by providing a domestic tribunal, before which the resiants might take the oath of allegiance and the frank-pledges might be inspected, without the trouble of attending the tourn, and to which

as an apparently necessary consequence, the criminal jurisdiction of the precinct or district was immediately transferred. In these private leets the grantee, called the lord of the leet, performed the duties which, in the public leet or tourn, after the ealdorman or earl had permanently absented himself, fell upon the sheriff. Their duties he might perform either personally or by his steward, though some writers, overlooking the authorities, have doubted whether the lord can sit in person. As a compensation for this, and his trouble in obtaining the franchise, it appears to have been the practice for the great land-owner who by his money and his influence had procured the grant of a private leet to claim from resiants a certain small annual payment by the name of certum letæ. The tenants within the precincts of a private leet, whether in boroughs, towns, or manors, formed a body politic wholly independent of the tourn or leet of the hundred; whilst such upland, or unprivileged, towns as had not been formed into or included within any private leet, still appeared, each by its tithing-man or reeve and four men of the tithing, and formed part of the body politic of the hundred. Each of these communities appears to have exercised most of those rights which it has of late years been supposed could not exist without a royal incorporation. In many cities and boroughs the antient authority of the court-leet was in later times superseded by charter of incorporation, in some of which the important right of popular election of magistrates was preserved entire; whilst in the great majority of cases the right, though continued in name, was fettered, if not rendered altogether nugatory, by restrictions of various characters and degrees, which are still to be seen in incorporated boroughs not regulated by the Municipal Corporation Act. In other respects the course prescribed by these charters was adapted to the changes which had taken place in the habits of the people since the institution of the court-leet. Many of the functions of the magistrates in the new incorporations were borrowed from the then comparatively recent institution of justices of the peace.

II.—*Constitution of the Court-leet.*

This court is a court of record, having jurisdiction of such crimes as subject the offenders to punishment at common law. The exclusive exercise of criminal jurisdiction being inherent in the kingly office, all criminal matters are denominated pleas of the crown, and the courts in which such pleas are held are the king's courts, although granted to a subject; for such grant operates merely as an authority to the grantee to preside judicially by himself or his steward, and to take the profits of the court to his own use. The authority so exercised under the king's grant is called a lordship, and the grantee is said to be the lord of the leet. It may be claimed either by a modern grant or by prescription, *i.e.* long established user, from which an antient grant is presumed. The grantee, whether claiming under a grant still extant or by prescription, is commonly the lord of a manor, and the leet is usually coextensive either with the actual limits of the manor, or with its boundary at some former period. There may however be several leets in one manor, and a leet may be appendant to a town, or to a single house. It is not necessary that the lord of the leet should have a manor, or indeed that he should have any interest in the land or houses over which the leet jurisdiction extends. It is competent to the crown to grant to A a leet over the lands of B, and the grantee of a leet in his own land may convey the land and retain the leet. As the leet was originally granted for the more convenient administration of justice, the lord may be required by writ of mandamus to hold the court. Upon non-user of a leet, the grant is liable to be seised into the hands of the crown, either absolutely as for a forfeiture, or *quousque*, that is until the defect be amended; the same consequence ensues upon neglect to appoint an able steward and other necessary officers, or to provide instruments of punishment.

Private leets are commonly held, as public leets *must* be, twice in the year, within a month after Easter, and within a month after Michaelmas, and even the former cannot, unless warranted by antient usage, be held at any other time except by adjournment. The court appears to have been formerly held in the open air. It should be held at its accustomed place, though, if sufficient notice be given, it may be held anywhere within the precinct. All persons above the age of twelve years and under sixty (except peers and clergymen, who are exempted by statute, and women and aliens), resiant within the precinct for a year and a day, whether masters or servants, owe suit to (*i.e.* personal attendance at) this court, and here they ought to take the oath of allegiance. The suit to the court-leet is said to be real (*i.e.* regal or due to the king), because every one bound to do suit to such court as a resiant, is also bound to take the oath of allegiance unless he has taken it before. But where a non-resiant is bound by tenure to join with the resiants in making presentments at the court-leet, the duty is not suit-real, for he shall not be sworn to his allegiance, &c., at this leet. It is merely suit-service, *i.e.* a suit forming one of the services due from the tenant to his lord in respect of the tenure. For the non-performance of such suit the remedy is by distress, as in case of other suits-service or rents-service. A man who has a house and family in two leets, so as in law to be conversant or commorant in both, must do his suit to the leet where his person is commorant, viz. where his bed lies, but if he occasionally reside in both, he is bound to do suit to each.

III.—*Jurisdiction of the Court-leet.*

The Anglo-Saxon Hundred Court appears to have had jurisdiction in all causes, civil, criminal, and ecclesiastical; and also to have had the cognizance and oversight of all the communities of frank-pledges within the hundred, the members of these communities being bound for that purpose to attend at the Hundred Court by themselves or their elected representatives. The jurisdiction of the Hundred Court in ecclesiastical matters was taken away by an ordinance of William the Conqueror, forbidding the attendance of the bishop.

It was the province of the court-leet, as well the public leet of the hundred, as the private leet, to repress all offences against the public peace, and to enforce the removal of all nuisances affecting the public convenience.

The leet jury possess a legislative authority in establishing by-laws. By laws made in a court-leet and embodied in the presentments of the jury in respect of matters properly cognizable in the leet are binding upon resiants, but not upon strangers. [BY-LAW.] A by-law imposing a penalty of 5*l.* per month for taking or placing an inmate without giving security to the overseers against any charge upon the parish was said by Lord Hale to be usual and valid. The leet jury elect their own chief magistrates, the reeve or constable, &c., of the private leet, and, as it would seem, the high constable (sometimes called the alderman) of the hundred.

Before the Norman conquest, and probably for some time after, this court of the leet was, if not the sole, at least the ordinary tribunal for the administration of criminal justice in the kingdom. Until the reign of Henry I., when, with respect to certain heinous offences, the punishment of death was substituted for pecuniary compositions, no crime appears to have been punished by death except that called in the laws of that prince 'Openthifte,' a theft where the offender was taken with the *mainour*, that is, with the thing stolen upon him. [ROBBERY.] Of this crime, as requiring no trial or presentment, the leet had no cognizance. Other offences, of however serious a nature, subjected the party to a mulct, or pecuniary fine, the amount of which was in many cases determinate and fixed.

Offences to be merely inquired of in leets are arson, burglary, escape, larceny, manslaughter, murder, rape, rescue, sacrilege, and treason, and every offence which was felony at common law. These offences being presented by the leet jury as indictors, and the indictment being certified to the justices of gaol delivery, the indictees may be arraigned; but they cannot be arraigned upon the mere production of the court-roll containing the presentments. Formerly all offences inquirable in leets were also punishable there by amercement; but the power of adjudicating finally upon crimes in courts leet, whether public or private, is now limited to such minor offences as are still left under the old system of pecuniary compensation. No matters are cognizable in the leet unless they have arisen or have had continuance since the last preceding court.

An amercement is a pecuniary punishment which follows of course upon every presentment of a default or of any offence committed out of court by private persons. Amercements are to be mitigated in open court by affeerers (afferratores, from afferrare or afforare, *afferer*, to tax, or fix a price, hence the term afferage, used in the old French law to denote the judicial fixing of a price upon property

to be sold). The afferers by their oaths affirm the reasonableness of the sum at which they have assessed the amercement. This course is sanctioned and confirmed by Magna Charta, which directs that amercements shall be assessed by the peers of the offender, i.e. the pares curiæ, or suitors of the same court. [JURY.] The amercements being affeered, are estreated (extracted) from the court-roll by the steward, and levied by the bailiff under a special warrant from the lord or steward for that purpose, by distress and sale of the goods of the party, which may be taken at any place within the precinct, even in the street; or the lord may maintain an action of debt for such amercement. For a nuisance, the jury may amerce the offender, and at the same time order that he be distrained to amend it.

The steward of a leet is a judge of record, and may take recognizances of the peace; and he may impose a fine for a contempt or other offence committed in court, as where a party obstructs the jury in the execution of their duties, or by public officers in the discharge of their duties out of court. The amount of the fine is at once fixed by the steward, and therefore, though sometimes loosely called an amercement, it is not to be affeered. When a suitor present in court refuses to be sworn, it is a contempt for which a reasonable fine may be imposed; so if the jury, or any of them, refuse to make a presentment, or depart without making it, or make it before all are agreed. But the fine must be set upon each person individually. For the fine so imposed the lord may distrain or bring an action of debt. In all matters within the cognizance of a court-leet the lord or steward has the same power as the judges in the superior courts. He has indeed no power to award imprisonment as a punishment for offences presented in the leet, such offences being the subject of amercement only; but he may imprison persons indicted or accused of felony before him, and persons guilty of a contempt in face of the court.

If a nuisance within the jurisdiction of a leet be not presented at the court-leet, the sheriff cannot inquire of it in his tourn, for that which is within the precinct of the leet is exempt from the jurisdiction of the tourn; which has merely the same jurisdiction as private leets in such parts of the hundred as are not included within any private leet.

A private trespass cannot be presented at the court-leet, even though committed against the lord; and a custom to present and amerce for such trespasses is void.

Of common right the constable is to be chosen by the jury in the leet; and if the party chosen be present, he ought to take the oath in the leet; if absent, before justices of the peace. If he refuse to accept the office, or to be sworn, the steward may fine him. If the party chosen be absent and refuses, the jury may present his refusal at the next court, and then he is amerced. But a person chosen constable in his absence ought to have notice of his election. A mandamus lies to the steward of a leet to swear in a constable chosen by the jury. By 13 & 14 Car. II., cap. 12, when a constable dies or goes out of the parish, any two justices may make and swear a new one until the lord shall hold a court-leet; and if any officer continue above a year in his office, the justices in their quarter-sessions may discharge him, and put another in his place until the lord shall hold a court. But the justices at sessions cannot discharge a constable appointed at the leet; and though they can appoint constables until the lord shall hold a court, they cannot appoint for a year, or till others be chosen. A person chosen constable who is deficient in honesty, knowledge, or ability, may be discharged by the leet or by the Court of King's Bench as unfit. The steward may set a reasonable fine on a constable or tithing-man refusing to make presentments.

Though the leet has long ceased to be the principal and ordinary court of criminal jurisdiction, its power and authority have been enlarged by several statutes, which give it cognizances over offences newly created, and it does not appear to have been at any time directly abridged by legislative interference. The business of the court has chiefly been affected by the erection of concurrent jurisdictions, particularly that of justices of the peace [JUSTICES OF THE PEACE], who have cognizance of the same matters, as well as of many others over which the court-leet has no jurisdiction. Justices of the peace are always accessible, whereas the court-leet is open only at distant intervals, and for a short period, unless it be continued by adjournment, which can only take place for the despatch of existing business. Another cause of the declension of these tribunals is that except in a very few cases the jurisdiction of the leet is confined to offences punishable at common law. In statutes providing for the repression of new offences, the leet is commonly passed over in favour of justices of the peace. Blackstone reckons 'the almost entire disuse and contempt of the court-leet and sheriff's tourn, the king's antient courts of common law formerly much revered and respected, among the mischievous effects of the change in the administration of justice by summary proceedings before justices of the peace.' It was not however left to the learned commentator to make this discovery. In the course of the very reign which witnessed the introduction of the modern system of justices of the peace, we find the Commons remonstrating against the violation of the Saxon principle of self-government and domestic administration of justice, resulting from the encroachments made upon the antient jurisdiction of the leet by giving to the new tribunal of the justices of the peace a concurrent jurisdiction in matters usually brought before the court leet, and an exclusive jurisdiction in other important matters. In the last year of Edward III. (1377), the Commons, by their petition in parliament, prayed the king that no justice of the peace should inquire of anything cognizable in the courts of lords who had view of frankpledge, or of anything cognizable in any city or borough within their district, and should attend only to the keeping of the peace and the enforcing of the statute of labourers. To this petition the king returned the following unsatisfactory answer:—'The statutes heretofore made cannot be kept if the petition be granted.' At this time, and until the passing of 27 H. VIII., c. 24, offences in leets were alleged to be against the lord's peace, not the king's.

IV. *Manner of holding the Court-leet.*

The common notice of holding the court is said to be three or four days; but it is now usual to give fifteen days' notice. An amercement at a court of which sufficient notice has not been given is void. But even where there is a clear prescriptive usage to give a certain number of days' notice, the resiants cannot disturb the holding of the court on the ground that such notice has not been given.

The functions of the steward of a court-leet are mostly, if not wholly, judicial. Ministerial acts are to be performed by an inferior officer called the bedel or bailiff, who of common right is appointed by the lord or steward, though by custom he may be chosen by the jury, and sworn with the other officers chosen at the leet; and where, in a leet appendant to a borough, the bailiff so chosen has a discretionary power in impannelling the jury, this important function is a sufficient ground for issuing a quo warranto to inquire into the title of the party exercising it. The steward, at the customary or at a reasonable time before the holding of the court, issues a precept under his seal, addressed to the bailiff of the leet, commanding him to warn the resiants to appear at the time and place appointed for holding the court, and to summon a jury. The notice may be given in the church or market, according to the usage of the particular place; but it is said that if it be not an antient leet, personal notice is necessary. According to the course most usually pursued, the steward opens the court by directing the court to be proclaimed; and this being the king's court, it is necessary that three proclamations should be made. This is done by the bailiff's crying 'Oyes' (hear) three times, and then saying once, 'All manner of persons who are resiant or deciners and do owe suit royal to this leet, come in and do your suit and answer to your names upon pain and peril which shall ensue.' The bailiff then delivers to the steward a list of persons summoned as jurymen, together with the suit or resiant roll. The suit-roll is then called over, and those resiants who are absent are marked to be amerced. The bailiff then makes three other proclamations, by crying 'Oyes' three times, and then saying, 'If any man will be essoigned, come in, and you shall be heard.' The steward having called for the essoigns, enters them. The essoigns should regularly be adjourned to the next court for examination in the court roll or book.

Suit-real must be done in person; it cannot be done by attorney; nor can it, as it would seem, be released by the lord. But the suitor may be essoigned, or excused *pro*

hâc vice, which is done generally upon the payment of an essoign penny.

The constables are next examined as to their compliance with the orders received by them at the previous court. After this the leet jury is formed. This jury is chosen from the body of the suitors, and consists of not less than twelve, nor more than twenty-three. In some leets the jury continues in office for a whole year; in others the jurors are elected and discharged in the course of the day. A custom for the steward to nominate to the bailiff the persons to be summoned on the jury is valid. If a sufficient number of resiants to form a jury cannot be found, the steward has power to compel a stranger to serve, even though he be merely travelling through the district, and is actually riding on his journey at the time his services are required; but a woman, though a resiant, cannot be sworn.

After the jury is chosen a foreman is named, who is sworn as follows;—'You shall well and truly inquire, and true presentment make, of all such articles, matters, and things as shall be given you in charge; the king's counsel, your companions', and your own, you shall keep secret and undisclosed. You shall present no man for envy, hatred, or malice; nor spare any man for fear, favour, or affection, or any hope of reward; but according to the best of your knowledge, and the information you shall receive, you shall present the truth and nothing but the truth.' As soon as the foreman is sworn, three or four of the jury, taking the book together, are sworn to observe and keep, on their parts, the same oath which the foreman has taken on his part. The jury then receive a charge from the steward, pointing out the nature of their duties, and of the matters which ought to be presented. The jury make their presentments to the steward, who, in cases of treason or felony, must return the presentments (in these cases called indictments) to the justices of gaol delivery if the offenders be in custody; if they be at large, the indictments must be removed into the King's Bench by certiorari, in order that process may issue thereon. In all other cases the steward of the leet has power, upon the complaint of any party grieved by the presentment, or, on the other hand, upon any suspicion entertained as to the concealment of any offence, by non-presentment, to cause an immediate inquiry into the truth of the matter by another jury, though in the former case the more usual course now is by certiorari or traverse.

A court-leet may be adjourned if the business of the particular court require it. This should be done by three proclamations. A court held on the 28th April, and adjourned, after the jury had been sworn, till the 15th December, which day was given them to make their presentments, has been held not to be necessarily unreasonable.

It is not necessary that notice should be given of an order made by the leet for abating a nuisance; the party being within the jurisdiction, must take notice of it at his peril. For the same reason he is also bound to take notice of a by-law.

V. *Profits of Court.*

The ordinary profits of a court-leet are the fines, amercements, and essoign pence, and belong, in the case of a public leet or tourn, to the king; in the case of a private leet, to the grantee or lord of the leet. It would rather seem however that the lord is bound to account at the Exchequer for these profits, though he may discharge himself by showing his title. In a private leet also, the lord, as above mentioned, is entitled to a further payment, in the nature of a poll-tax, capitagium, or chevage, by the name of certum letæ, sometimes called cert-silver, certainty-money, cert-money, and head-silver. When this payment is to be made on the day of the leet the defaulters may be presented and amerced. For such amercement the lord may distrain; but he cannot distrain for the cert-money itself, without a prescription to warrant such distress. In the absence of both amercement and prescription, the lord's remedy is by action of debt.

LEEUWARDEN, situated in 53° 12′ N. lat. and 5° 43′ E. long., is the chief town of the province of Friesland, in the kingdom of the Netherlands. It is surrounded with an earthen rampart and a wide moat; the broad straight streets are intersected by canals, the banks of which, as well as the ramparts, are planted with trees, and afford very pleasant promenades. The town, which is well built, has manufactures of linen and paper, and has a considerable trade, which is much facilitated by canals communicating with the sea, and with Dokkum, Franeker, and Haarlingen. The principal buildings are the town-hall, the prinzenhof, or palace of the princes of Orange, as hereditary governor of the province, a synagogue, and twelve churches, the largest and handsomest of which contains several monuments of the princes of the house of Orange. The population is 21,000.

LEGACY (Legatum), a bequest or gift of goods and chattels by will or testament. The person to whom it is given is termed the legatee (legatarius); and every person is capable of being a legatee, unless particularly disabled by the common law or by some statute.

The bequest in no case confers more than an inchoate property on the legatee, which does not become complete until the assent of the executor or administrator with the will annexed, as the case may be, has been given. [EXECUTOR.] But, before such assent, the bequest is transmissible to the personal representatives of the legatee, and will pass by his will.

Legacies are of two kinds, general and specific. A legacy is general when it is so given as not to amount to a bequest of a particular thing, or a particular fund of the testator; a specific legacy is a bequest of a specified thing, or a specific part of the testator's estate. The whole of the estate of a person deceased being liable for the payment of his debts, legacies of both kinds are of course subject to debts: but in case of a deficiency of the estate for the payment of the legacies, the general legatees can only be paid in equal proportion; and they must, as it is technically termed, *abate*. But a specific legatee is not compelled to abate or allow any thing by way of abatement, though his legacy may be taken for the payment of debts, in case the general legacies have all been applied to pay them and there is still a deficiency to meet the demands on the estate of the deceased. Specific legatees may however be compelled to abate as against one another. If the part of the testator's estate which is specifically given has been disposed of by the testator in his lifetime, or at the time of his death has ceased to exist in such form as described in his will, the general rule is, that the specific legatee loses his legacy, and is not entitled to any satisfaction out of the general estate: in such case the legacy is said to be adeemed, a term which has been derived from the Roman law, though the word 'adimere' is not there [illegible] exactly in this sense (*Dig.* 34, 4.) There is also a third description of legacy, partaking somewhat of the nature of both kinds already mentioned, as a gift of so much money, with reference to a particular fund for payment. This is called a *demonstrative* legacy, but so far differs from one properly specific, that if the fund pointed out fails on any account, the legatee will be paid out of the general assets; yet it is so far specific that it is not liable to abate in case of a deficiency of the general assets.

Legacies may be given either absolutely (purè) or upon condition (sub-conditione), or upon the happening of any contingency; provided it must happen, if at all, within the duration of a life or lives in being at the time of the decease of the testator and 21 years afterwards, allowing in addition the period of gestation where the contingency depends upon the birth of a child. Legacies may also be given in such a way that though no condition is expressed in distinct terms, it may be clearly inferred that the testator did not intend his gifts to take effect till a definite time had arrived or a definite event had taken place. When a legatee has obtained such an interest in the legacy as to be fully entitled to the property in it, the legacy is said to be *vested*, and this property may be acquired long before the right to the possession of the legacy accrues. A vested legacy partakes of the incidents of property so far as to be transmissible to the personal representatives of the party entitled to it, or to pass by his will; a legacy which is contingent or not vested is no property at all with respect to the legatee. This distinction of legacies, vested and not vested, seems derived from the Roman law, which expresses the fact of vesting by the words 'dies legati cedit.'

Formerly, in all cases when a legatee died before the testator, the legacy lapsed, or failed, and went to the person appointed residuary legatee by the testator, or if there was none such, to the next of kin; and lapse might also take place (as already observed with respect to a legacy given to a legatee at a particular time, or upon condition, or the happening of a contingency) if the legatee died before the appointed time arrived, or if the condition was not performed,

or the contingency did not happen. The recent statute, 1 Vict., c. 26, sect. 33, has modified the old rule, and directs that when legacies are bequeathed to a child or other issue of the testator who shall die in his lifetime, leaving issue, and such issue shall be living at the testator's death, the legacies shall not lapse unless a contrary intention appears upon the face of the will, but shall take effect as if the legatee had died immediately after the testator.

The rules by which gifts of legacies are construed are derived from the civil law, or rather are a part of that law, which prevails in the ecclesiastical courts; for although the court of chancery has concurrent jurisdiction over legacies with the ecclesiastical courts, yet to prevent confusion it follows the same general rules. If however a legacy be charged upon or made payable out of real estate, then, as the ecclesiastical court has no concurrent jurisdiction, courts of equity are not bound to follow the same rules as to the construction of such gifts as in the case of personal estate.

The questions involved in the law relating to legacies are so numerous that it is quite impossible even to notice them in an article of this description, and as they are chiefly of a technical nature, the reader is referred to the various treatises on that branch of the law.

Generally speaking an executor cannot be compelled to pay legacies until after the expiration of twelve months from the decease of the testator, and not even then unless the assets should be realized and the debts paid or provided for; but as the rule is only for the general convenience of executors, if it should appear that all the debts of the testator are paid, the executor may be compelled to pay the legacy before the twelve months have expired. It may be stated however as a general rule, that legacies are payable twelve months after the death of a testator, and with interest from that time at 4 per cent., unless the testator has made some special provision as to time of payment and interest. The rule as to the twelve months is taken from the Roman law. It has already been stated in this work [EXECUTOR], that an action at law does not lie for a legacy, until after the executor has admitted that he has assets in his hands sufficient to make the payment, or in the case of a specific legacy, has assented to it. But the law may perhaps be more correctly stated thus: Where a specific legacy consists of some determinate chattel, whether real, as a lease for years, or personal, as a particular horse, the legatee, after assent by the executor to the legacy, may take possession of it, or sue for it by action at law; but where the specific legacy consists of money, &c., and in all cases of general and of demonstrative legacies, no action at law lies unless the executor has, for some new consideration beneficial to himself, expressly promised payment. As a general rule therefore it may be stated that the remedies by legatees against executors are afforded by the courts of equity. (Roper *On Legacies*; Williams *On Executors*.)

On the subject of legacies (legata) under the Roman law, Gaius (ii., 192-255) and the *Digest*, lib. xxx., xxxi. xxxii., 'De Legatis et Fidei commissis,' are the authorities This is one of the subjects on which the Roman jurisconsults have most successfully exercised their sagacity and diligence.

LEGATE (from the Latin Legátus). This word had various significations among the Romans. The legates were the chief assistants of the proconsuls and propraetors in the administration of the provinces. The number of legates differed according to the quality of the governor whom they accompanied; their duties consisted in hearing inferior causes and managing all the smaller affairs of the government. They appear to have been chosen and appointed by the governor, though at the first institution of the office it would seem they were selected by the senate, as advisers to the governor, from the wisest and most prudent of their own body. The word legatus also signified a military officer who was next in rank to the general or commander-in-chief in any expedition or undertaking, and in his absence had the chief command. (Caesar, *De Bell. Civ.*, ii., 17.) The word legatus is also often used to denote a person sent by the Roman state to some other state or sovereign power on matters that concerned the public interest: in this sense the word corresponds pretty nearly to our ambassador or envoy, except that the motives for sending a legatus, or legate, seem to have been occasional only, and the legates do not appear ever to have been permanent resident functionaries in a foreign community. Under the emperors those who were sent by them to administer the provinces of which the government was reserved to the emperors, were called legates.

Under the republic the senators who had occasion to visit the provinces on their own business used to obtain what was called a 'legatio libera,' that is, the title and consideration of a legatus, or public functionary, with the sole object of thereby furthering their private interests. These legationes are said to have been called liberae, or free, because those who held them had full liberty to enter or leave the city, whereas all other public functionaries whose duties were exercised beyond the limits of the city could not enter Rome till they had laid aside their functions; or because a senator could not go beyond a certain distance from Rome unless he obtained permission in the form of a legatio. Cicero, who on one occasion inveighs vehemently against the legatio libera, could defend it when it suited his purpose, and in a letter to Atticus (i. 1.) he expresses his intention to visit Cisalpine Gaul in this capacity for the purpose of furthering his election as consul.

At the present day a legate signifies an ambassador, or nuncio, of the pope. They are of the highest class of ambassadors. [AMBASSADOR; NUNCIO.]

There are several kinds of papal legates, *legatus a latere*, *legatus natus*, &c. Legates a latere are sent on the highest missions to the principal foreign courts, and as governors of provinces of the Roman dominion, thence called legations. Legatus natus is a person who holds the office of legate as incident and annexed to some other office, and is, as we should say, a legate *ex officio*. As this office or title exempted the holder from the authority of the legates a latere, it was earnestly sought after by the bishops. The archbishop of Canterbury was formerly a legatus natus, and there are now three or four German bishoprics permanently invested with the privileges of the office. Legates of a lower rank than cardinals are called nuncii apostolici.

LEGEND (from the Latin word *legendum*, a thing to be read) is used commonly in the sense of fabulous or doubtful narratives, such as the exploits of heroes of the middle times, between history and fiction, tales of superstition, or other subjects, in which credulity and imposture find free room for exercise. Thus legends have come to signify that which is usually rather matter of tradition than of written evidence. In our old authors the word occurs in its simple meaning.

Legend is also used technically to denote the words encircling a coin; to writing on tablets the word *inscription* is applied, which is also used instead of legend where a sentence, instead of encircling, occupies the place of a device on the coin.

LEGENDRE, ADRIEN MARIE, an analyst, whose name must follow those of Lagrange and Laplace in the enumeration of the powerful school which existed in France at the time of the Revolution, was born at Paris in 1751, and died there January 10, 1833. No authentic account of his personal life has yet been published: so that we can only now say that it was passed in strenuous and successful exertions for the advancement of mathematical science and of its applications. He never filled any political post, or took any marked part in public matters: he was, we believe, no favourite of any government, and his scientific fame did not procure him more than a very moderate competency. The writings of M. Legendre consist of various papers in the Memoirs of the Academy of Sciences, and several separate writings of which we shall give a slight account.

The first appearance of Legendre as a mathematician was (A.D. 1782) as the writer of two papers, one on the motion of resisted projectiles, the other on the attraction of spheroids, which gained prizes from the academies of Berlin and Paris, and a place in the former as the successor of D'Alembert In a memoir on double integrals, published in the volume for 1788 (though presented at the end of 1789), he digested a method of transforming an integral with two variables to one depending upon other variables, which he applied to the question of the attraction of spheroids. He was the first who extended the solution of this question by the aid of modern analysis: it being not a little remarkable, that this problem in the year 1773 required the power of Lagrange to show that even as much could be done with it by the modern analysis as had been effected with the antient methods by Newton and Maclaurin. Various other memoirs by Legendre refer either to points of the integral cal-

culus, or to his geodetical operations. In 1787 he was appointed one of the commissioners for connecting the observatories of Greenwich and Paris by a chain of triangles. Cassini de Thury had memorialized the British government on the expediency of this step: the execution of which was committed to General Roy on the English side, and to Legendre, Cassini, and Méchain on the French. Much of the work was completed in 1787, and a memoir of Legendre, published in the volume for that year, upon some theoretical points, contains one of those simple and beautiful theorems which carry the name of their inventors with them for ever. It is the celebrated proposition relative to the *spherical excess* [TRIGONOMETRY] of a small spherical triangle. An account of the actual triangles constructed in his survey is contained in the volume for 1788. When the grand French arc of the meridian was completed, Laplace and Legendre were employed to deduce the form of the spheroid which agreed most nearly with all the observations. In the construction of the large trigonometrical tables (which still remain unpublished) he contributed some simplifying theorems. In 1806 he published his 'Nouvelles Méthodes pour la Détermination des Orbites des Comètes,' in which he gives a method the peculiarity of which then was that it allowed of the correction of the original observations at any part of the process. It may be doubtful whether the method itself was an improvement upon those which were then in use; and if it were, it is still superseded by others posterior to it. But this tract is further remarkable by its containing the first proposal to employ the method of least squares. [LEAST SQUARES, METHOD OF.] Whether Legendre had seen the hint of Cotes or not, he made a proposal of great ingenuity, and introduced, as a matter of practical convenience, a method which was afterwards shown by Laplace to be entitled to confidence on the strictest grounds of principle.

Legendre applied himself at an early period of his life to the development of those integrals on which the determination of the arcs of an ellipse and hyperbola depend. In the Memoirs of the Academy for 1786 are two papers on the subject written by him. His 'Exercices du Calcul Intégral,' published in 1811, contain, among other matters of high curiosity, an extended view of the same subject. He continued to devote himself assiduously to the cultivation of this new branch of science, and in 1825 and 1826 he produced the two volumes of his 'Traité des Fonctions Elliptiques et des Integrales Euleriennes,' containing a digested system, with extensive tables for the computation of the integrals. The work was hardly published when the discoveries of MM. Abel and Jacobi appeared. These mathematicians, both then very young, had begun by looking at the subject in another point of view, and had produced results which would have materially simplified a large part of the work of Legendre, it he had had the good fortune to find them. With a spirit which will always be one of the brightest parts of his reputation, Legendre immediately set about to add the new discoveries to his own work; and in 1828 and subsequent years appeared three supplements, in which they are presented in a manner symmetrical with the preceding part of the work, and with the fullest acknowledgment of their value and of the merit of their authors.

To Legendre is also due the collection of the results obtained upon the theory of numbers [NUMBERS, THEORY OF], a subject to which he made very remarkable additions. The second edition of his 'Théorie des Nombres' was published in 1808, and the third in 1830.

The best known of Legendre's works is, as might be supposed, his Elements of Geometry, of which Sir David Brewster gave an English translation in 1824, from the eleventh edition: Legendre published his twelfth edition in 1823. Of the finished elegance and power of this very remarkable work it is not easy to speak in adequate terms: and next to the Elements of Euclid, it ought to hold the highest place among writings of the kind. But it would not be difficult to show that much of the rigor of Euclid has been sacrificed, and though those who determine to abandon the latter cannot do better than substitute Legendre's work, we hope that in this country the old Greek will maintain his ground at least until a substitute can be found who shall give equal rigor of demonstration, as well as greater elegance of form.

LEGER *Lines and Spaces* (*Leger*, Fr., *light*), the lines and spaces added to the staff when the notes exceed the ordinary compass. The word is often most improperly written *Ledger*.

LEGHORN. [LIVORNO.]

LEGION. In a Roman consular army each grand division, corresponding nearly to a modern brigade, was so denominated; and the word indicates a selection of the individuals composing such division. The name is still occasionally given to a body of troops consisting of several regiments or battalions, when raised at a particular place or for a particular service.

The strength of a Roman legion varied at different periods. When Romulus divided the citizens of his newly-formed state into three portions or tribes, he also divided the men who were able to bear arms into bodies of 3000 men, and each of these constituted a legion, which was commanded by one or three præfects or tribunes. (Plutarch, in *Rom.*) Servius Tullius, who, by the enlargement of the city, formed a fourth tribe, is supposed to have raised the strength of the legion to 4000 men. About 150 years afterwards, when Camillus marched against Satricum, he had four legions, each of which consisted of that number of men (Liv., i. 22); but, twenty years later, the strength of the legion is stated to have been 5000 foot and 300 horse. (Liv., viii. 8.) This probably continued to be the general establishment of that body of troops, though particular circumstances might cause it to be occasionally increased. Scipio landed in Africa (Liv., xxix. 24) with two legions, each consisting of 6200 men (though the best commentators suppose that 5200 is meant); and while the Roman army was acting against Perseus in Macedon, each legion contained 6000 foot and 200 horse. (Liv., xliii. 12.) Vegetius, who lived in the fourth century, describes the legion (lib. ii., cap. 6) as a body consisting of 6100 foot soldiers, besides 720 horsemen; but he designates this the antient legion, and his account is probably applicable only to the state of that body in the age of Hadrian and the Antonines. The legion declined under the later emperors, and in the time of Constantine it appears to have consisted of only 1500 men.

During the reign of Augustus twenty-five legions were placed permanently on the frontiers of the empire; and in the time of Hadrian the number of legions composing the Roman army was 30, exclusive of the auxiliaries. Their disposition in Italy and the provinces may be seen in Gibbon, vol. i., ch. 1. The legions were denoted by numbers, and they were further designated by the name of the emperor who raised them, or by the name of the place where they were raised, or where they had distinguished themselves.

The manner in which the soldiers were elected to serve in the legions is fully described by Polybius (book vi., ch. 1), who lived in the age of Fabius and Scipio; and it may be presumed that this was in accordance with the prescribed regulations, which however were only followed when the necessities of the state did not compel the magistrates to dispense with them. When an army consisting of four legions was to be raised, the citizens of the proper ages being assembled on an appointed day in the Capitol, the military tribunes drew out the tribes by lot, and from that which was first called they selected four men of nearly equal age and stature: of these the tribunes who were appointed to the first legion chose one; those who were appointed to the second legion chose another; and so on. Afterwards the whole body of the tribunes chose four other men, and of these the tribunes of the second legion first chose one; those of the third legion then chose another; and so on, the tribunes of the first legion taking the last man of the four. In like order the election proceeded, till the required number of men was obtained. Polybius states that, in his time, the horsemen were enrolled before the foot soldiers, but that antiently the former were chosen last.

Immediately after the enrolment, the recruits for the legions being made to advance one by one, each was sworn to be obedient to his commanders, and to execute all the orders which he should receive from them to the utmost of his power.

When soldiers were to be raised from the allied cities of Italy, notice appears to have been sent by the consuls to the magistrates of those cities, who then enrolled men in a manner similar to that which was practised at Rome; and, having caused them to be disciplined, sent them to join the army.

On the institution of regular bodies of troops by Romulus, he is said to have divided them (probably each legion) into

companies of 100 men, and these were called *Manipuli*, from the bundles of grass which served as standards for the people who accompanied him when he attacked the palace of Amulius. (Aur. Victor, *Origo Gen. Rom.*, c. 22.) The first mention of a cohort occurs shortly after the expulsion of the kings (Liv., ii. 11); and in the time of Polybius the legion was divided into ten cohorts, each of these into three manipuli (Polyb., b. xi.), and each of the latter into two centuriæ. [COHORT.] A manipulus must have then consisted of 200 men; and at a later period it designated a body of less than the original number. Under Hadrian and the emperors immediately following him the cohorts appear to have been of unequal strength. Vegetius states that the first, which was called *cohors milliaria*, and which carried the eagle, consisted of 1500 foot and 132 horsemen; the second, called *cohors quingenaria*, of 555 foot and 70 horsemen; and that the remaining cohorts were nearly of the same strength as the second.

Servius Tullius is said to have divided the military force into five different classes of troops (Liv., i. 43), which were distinguished by their armour; but from the commencement of the republic, or nearly so, the order of battle consisted of three lines of troops, the *Hastati*, the *Principes*, and the *Triarii*. (Liv., viii. 8.) The *Velites* (light troops or skirmishers) had no particular station, and, except the latter, all the troops, according to Polybius, were armed nearly in the same manner.

The youngest men were selected to act as velites: they were armed with bows or slings, and some of them carried a light javelin. After the time of Marius these ceased to be enrolled as legionary troops, and were chiefly foreigners. Vegetius designates them *Ferentarii*. They wore short swords, and were provided with bucklers of a circular form, about three feet in diameter. The staff of their javelin was two cubits long, and as thick only as a finger; the iron head tapered gradually to a fine point, in order that, being bent at the first discharge, it might be rendered useless to the enemy.

The hastati of all the cohorts were stationed in the first line; the principes formed the second, those of each cohort supporting their own hastati; and the triarii were similarly disposed in the third line to support the principes. All the three classes were completely armed with cuirass, helmet, and greaves; their buckler was 4 feet long and 2½ feet broad, and five arrows were placed in its concavity, to be thrown when necessary. Each man was provided with a long and a short sword, the blade of the former being strong, and made either to cut or thrust; and he carried, besides, two javelins, or *pila*. (Polyb., b. vi.) The only difference in the arms of the three classes seems to have consisted in the size of the *pilum*, those used by the triarii, or veteran soldiers, in the time of Varro being longer and heavier than those of the men in the other lines.

It is supposed that originally the principes were stationed in the first line, and that they were men of the superior classes; from which circumstance, or because they came first into action, they may have acquired their designation.

The front of the legion, when in order of battle, was formed by ten corps of the hastati, each corps being arranged with 16 men in front, and 10 in depth. The second line, or that of the principes, was of the same strength, and was drawn up in the same manner. The line of triarii consisted also of ten corps; but these had only 10 men in front and 6 in depth. Every legionary soldier was allowed five feet in front, and as much in depth, in order that he might be enabled to make free use of his arms.

The cavalry of a Roman legion was divided into ten *turmæ*, of about 30 horsemen each, who, in order of battle, were drawn up with 8 in front, and 4 in depth. Each legion of the allies had however 600 horsemen; so that the cavalry of a consular army (consisting of two Roman legions and two legions of allies) amounted to 1800 men, who were disposed on the wings of the legion, in one line or two, according to circumstances. The legionary cavalry were furnished with cuirasses and helmets, and they were accompanied by light-armed horsemen, who served as archers.

LEGISLATION. In treating of legislation, we will explain,—1st, the meaning and etymology of the word; 2nd, the distinction between the legislative and executive powers of government; and 3rd, the difference between jurisprudential and legislative science—under which head we will make some remarks respecting the most convenient form for the composition of laws.

1. *Meaning and etymology of the word Legislation.*—A magistrate who proposed a law in Rome for the adoption of the assembly of citizens was said *legem ferre* (as we say, to *bring* a bill into parliament); and the law, if carried, was said to be *perlata*, or simply *lata*. Hence the term *legum lator*, or *legislator*, was used, as synonymous with the Greek νομοθέτης, in the sense of a lawgiver. From *legislator* have been formed *legislation*, *legislative*, and *legislature* (the latter word signifying a person or body of persons exercising legislative power).

Legislation means the making of positive law. Positive law, as explained in the article LAW, is made by the person or persons exercising the sovereign power in a community. The end of positive law, as explained in the same article, is the temporal happiness of the community.

2. *Distinction between the legislative and executive powers of government.*—A general command, or law, issued by a sovereign government would be nugatory, if it was not applied in practice to the cases falling within its scope, and if the pains denounced for the violation of it were not inflicted on transgressors. The execution of the general commands, or laws, of a sovereign government is therefore an essential part of the business of a government. Accordingly the ordinary functions of a government may be divided into the two classes of *legislative* and *executive*.

An *executive* command, or act, of a sovereign government, is a special command issued, or act done, in the execution of a law previously established by the government. Executive commands or acts are of two sorts, viz. *administrative* and *judicial*. The distinction between these two sorts of executive commands or acts may (in conformity with modern phraseology) be stated as follows. A judicial proceeding is a declaration, by a competent authority, that a person has (or has not) brought himself within the terms of a certain penal provision, or that he has (or has not) a certain legal right or obligation which another disputes with him. An administrative proceeding is for the sake of carrying a rule of law into effect, where there is no question about the legal culpability, or dispute about a legal right or obligation of a person. In an administrative proceeding the government functionary acts, or may act, spontaneously; in a judicial proceeding he does not act until he is acted upon by others. A judge cannot act until his court is (to use the French phrase) *seized*, or *saisi*, with the question; or (to use the language of our ecclesiastical courts) it is necessary 'to promote (or set in motion) the office of judge.' (Dégérando, *Institutes du Droit administratif Français*, Paris, 1829.)

It should be observed, that the division of the functions of government into legislative and executive is not exhaustive; inasmuch as neither class comprehends acts or special commands not founded on a previous general command or law, in other words, *privilegia*, concerning which see the article LAW.

The distinction between the making of laws and their execution is too obvious to have been overlooked by the ancient writers on government. The latter subject was treated by them under the head of *magistrates*. (See, for example, Aristot., *Pol.*, vi. 8.) The distinction has however attracted peculiar attention from both speculative and practical politicians since the beginning of the last century, in consequence of the great importance attributed by Montesquieu to the separation of the legislative, administrative, and judicial powers of government; *i.e.* the exercise of the administrative and judicial functions by officers distinct from the supreme legislative body, and from each other. (*Esprit des Lois*, xi. 6.) The importance of the separation in question has however been overrated by Montesquieu; and it has never existed, and indeed can scarcely exist, to the extent which he supposes. The legislative functions of a government can be distinguished, logically, from its executive functions; but these functions cannot, in every case, be severally vested in different persons. In every free government (or government of more than one) the legislative bodies exercise some executive functions: thus, in England, the House of Lords is an appellate court in civil cases, and the House of Commons decides in cases of contested elections of its own members. In every form of government the public functionaries, whose primary business is the execution of the laws, exercise a considerable portion of (delegated) legislative power. It is scarcely pos-

sible to conceive a body of law so complete as not to require subsidiary laws for carrying the principal laws into execution, and a power of making these subsidiary laws must, to a greater or less extent, be vested in the executive functionaries. In the article LAW we have distinguished laws made by supreme from laws made by subordinate legislatures. The latter class of laws usually emanate from executive functionaries, especially judges. (Austin's *Province of Jurisprudence*, p. 244-9.)

3. *Difference between jurisprudential and legislative science.*—Positive law may be viewed from the two following aspects. First, it may be considered as an organic system, consisting of coherent rules, expressed in a technical vocabulary. Secondly, its rules may be considered singly, with reference to their tendency to promote the happiness of the community; in other words, their expediency or utility. Law viewed from the former aspect is properly the subject of the science of jurisprudence. [JURISPRUDENCE.] Law viewed from the latter aspect is the subject of a department of political science which is generally termed *legislative science*. (Legislation, in strictness, is concerned about the technical form, as well as the utility, of a law; but the term legislative science, as just defined, is sufficiently accurate for our present purpose.)

It is important to bear in mind the distinction, just pointed out, between the scientific or technical excellency of a system of law, and the expediency or utility of the rules of which it is composed. The distinction, however manifest, has been frequently overlooked, even by lawyers. Thus Sir W. Blackstone, in describing the struggle made by the clergy to substitute the Roman law for the common law of England, gives the preference to the latter system on the ground of the imperial government of Rome being despotic. The excellence of a system of law, considered in a scientific point of view, has no connexion with the form of the government by which the laws were established. Law may be, and has been, cultivated as a science with admirable success under very bad governments. The scientific cultivation of law in Rome scarcely began until the Empire; and the great legal writers of France lived in times of political anarchy or despotism. A system of law of which the practical tendency may be most pernicious may have the highest scientific or technical excellence. A code of laws establishing slavery, and defining the respective rights and duties of master and slave, might be constructed with the utmost juristical skill; but might, on that very account, be the more mischievous as a work of legislation. On the other hand, a system of law may be composed of rules having a generally beneficial tendency, but may want the coherency and precision which constitute technical excellence. The English system of law affords an example of the latter case. Owing to the popular character of the legislature by which its rules were enacted or sanctioned, it has a generally beneficial tendency; but considered in a scientific point of view, it deserves little commendation. The writings of Mr. Bentham, in like manner, are far more valuable contributions to legislative than to jurisprudential science. The remains of the writings of the Roman lawyers, on the other hand, are of little assistance to the modern legislator, but they abound with instruction to the jurist.

The distinction between the technical excellence of a law and its expediency, or (in other words) between its form and its substance, is also important with reference to the question of *codification*, i.e. the making of a code of laws.

The making of a code of laws may involve any one of the three following processes:—1. The formation of a new system or body of laws. 2. The digestion of written laws, issued at various times, and without regard to system. 3. The digestion of unwritten law, contained in judicial decisions and authoritative legal treatises. The antient codes of law were, for the most part, works of new legislation; such were, for example, the codes of Solon and Draco, the Twelve Tables, the code of Diocles of Syracuse, and others. The *codices* of Theodosian and Justinian afford examples of the digestion of written laws. [CONSTITUTIONS, ROMAN.] The Digests or Pandects of Justinian afford an example of the digestion of unwritten law. The French codes were not digests of the existing law of France, either written or unwritten; but they were in great measure founded on the existing law. The same may be said of the Prussian Landrecht. The statutes for consolidating various branches of the criminal law, the bankruptcy laws, the customs laws, the distillery laws, &c., are instances of the digestion of the written law of England. The Criminal Law Commissioners have furnished a specimen of a digest of the English common (or unwritten) law relating to theft. (*First Report*, 1835.) The digestion of existing law, whether written or unwritten, requires merely juristical ability: the making of new laws requires, in addition to the knowledge and skill of the jurist, that ability which we have termed legislative. In other words, the making of new laws requires both attention to their utility or expediency, and technical skill in the composition or drawing of them. Popular forms of government secure a tolerably careful examination of laws, with reference to their expediency; but they do not secure attention to the technical or scientific department of legislation. Indeed nearly all the principal codes of laws have emanated from despotic governments, viz. the Roman, Prussian, Austrian, and French codes. The difficulty of passing an extensive measure through a popular legislature has, in free governments, discouraged attempts at systematic digestion of the law. The digest of the law of real property in the state of New York however affords an example of such digest passed by a popular legislature.

The most convenient form for the composition of laws is a subject which has exercised many minds, but on which we cannot, consistently with the plan of this Cyclopædia, make more than a few remarks.

The inconveniences arising from too great prolixity or too great conciseness in the phraseology of laws are stated by Lord Bacon, in the 66th and 67th aphorisms of his eighth book *De Augmentis*. If an attempt be made, by an enumeration of species, to avoid the obscurity which arises from the use of large generic terms, doubts are created as to the comprehensiveness of the law; for, as Lord Bacon well observes, 'Ut exceptio firmat vim legis in casibus non exceptis, ita enumeratio infirmat eam in casibus non enumeratis.' (*Ib.*, aph. 17.) On the other hand, vague and extensive terms, if unexplained, are obscure and frequently ambiguous. The best mode of producing a law which shall at once be comprehensive, perspicuous, and precise, probably is, to draw the text of the law in abstract and concise language, and to illustrate the text with a commentary, in which the scope, grounds, and meaning of the several parts of the law are explained. A commentary such as we now speak of was suggested by Mr. Bentham (*Traités de Législation*, tom. iii., p. 284; *De la Codification*, s. 4), and the penal code recently prepared for India has been drawn according to this plan. Doubts will arise in practice respecting the interpretation of the most skilfully drawn laws; and the best guide to the interpretation of a law is an authentic declaration, made or sanctioned by the legislature which enacted it, of its scope or purpose. The want of such a commentary frequently causes the scope of a law to be unknown; and hence the tribunals often hesitate about enforcing laws which may be beneficial. (*Dig.*, lib. i., t. 3, fr. 21, 22.)

It seems scarcely necessary to say that laws ought, where it is possible, to be composed in the language most intelligible to the persons whose conduct they are to regulate. In countries where the great majority of the people speak the same language (as in England or France), no doubt about the choice of the language for the composition of the laws can exist. In countries however where the people speak different languages, or where the language of the governing body differs from that of the people, or where the bulk of the people speak a language which has never received any literary cultivation, a difficulty arises as to the language in which the laws shall be written. Where the people speak different languages, authentic translations of the original text of the laws should be published. Where the language of the governing body differs from that of the people (which is generally the case in newly-conquered countries), the laws ought to be issued in the language of the people. It is comparatively easy for a small number of educated persons to learn a foreign language; whereas it is impossible for the people at large speedily to unlearn their own, or to learn a new tongue. Thus the Austrian government in Lombardy uses the Italian language in all public documents. Where the language of the bulk of the community has not received a literary cultivation, the language used by educated persons for literary purposes must be employed for the composition of the laws. Thus in Wales, the

Highlands of Scotland, and the west of Ireland, the language of the laws and the government is not Celtic, but English; and in Malta, where the bulk of the people speak a dialect of Arabic, the laws are published and administered in Italian, which is the literary language of the island.

LEGNA'GO. [VERONA.]

LEGRAND, JACQUES GUILLAUME, a French architect and a writer on subjects of architecture, was born at Paris, May 9th, 1753. When studying in the Ecole des Ponts et Chaussées he attracted the notice of Perronet, and was, while yet very young, entrusted with the execution of the bridge at Tours. His taste however disposed him far more to architecture than to engineering; and he accordingly placed himself under Blondel, and, after his death, pursued his studies under Clerisseau, who, esteeming his character no less than his talents, bestowed his daughter upon him in marriage. With Molinos, his friend and his professional associate in most of his works, he made a tour through Italy, and was preparing to investigate the remains of art in Magna Græcia, when he was recalled home by the government. From that period he was employed during nearly twenty years in restoring several public edifices and erecting others. One of his most noted works, which he executed in conjunction with Molinos, was the timber cupola of the Halle aux Bleds. The Théatre Feydeau, the restoration of the Fontaine des Innocens, of the Halle aux Draps, and of the interior of the Hôtel Marbœuf, besides a number of designs for private individuals, were executed by him. He had been appointed to conduct the repairs of the abbey of St. Denis, and had removed to that place for the purpose of giving his undivided attention to the works, just before his death, which happened November 10th, 1806. Among his writings are the text to the 'Edifices de Paris' and the 'Galerie Antique,' and to many of the architectural subjects in the 'Annales du Musée;' also the architectural portion of Cassas's 'Voyage Pittoresque d'Istrie,' and that of 'Phenicie;' and an octavo volume to accompany Durand's 'Parallèle d'Edifices.' This last was merely the sketch of a more complete and detailed history of architecture, which, had he lived to execute it as he had proposed, would have extended to thirty volumes.

LEGU'MIN, a peculiar vegetable product obtained by Braconnot from peas, and which he considers as a vegetable alkali. To obtain this substance, ripe dried peas are to be digested in warm water, to be reduced to a pulp in a mortar, and water being added, the liquor is to be strained; this is milky, and when allowed to deposit those substances which are merely suspended in it, is still turbid, and appears to contain legumin in combination with some vegetable acid. During evaporation a translucent substance separates at the surface of the liquor, which appears to be legumin combined with some vegetable acid; it is of a greenish-grey colour, does not redden litmus, but restores its blue colour when reddened by an acid; it is insoluble in alcohol, but this dissolves the chlorophylle; after being long boiled in the alcohol it resembles starch, and becomes transparent and white by drying. It dissolves in very dilute vegetable acids, such as the oxalic and tartaric, but the mineral acids precipitate it from solution in them. It is readily dissolved by the alkalis and their carbonates in solution, even when very dilute.

Legumin appears to be a substance intermediate as to gluten and vegetable albumen; it differs from the first in being insoluble in alcohol, and from the last in readily dissolving in the alkaline carbonates; it contains some sulphur, and also azote, but less than animal albumen; it is precipitated from solutions which are not acid by bichloride of mercury, and also by infusion of galls. It exists in peas and beans to the amount of about 18 per cent. It has not been completely analyzed.

LEGUMINO'SÆ, or FABA'CEÆ, a very extensive natural order of plants inhabiting the coldest and hottest, the dryest and dampest parts of the world, assuming the greatest varieties of form and size, some being among the smallest of flowering plants, others forming the largest trees in tropical forests, and varying in an extraordinary degree in their sensible qualities, some being eatable, as peas, beans, and other pulse; others poisonous, as Piscidia, Tephrosia, and Cytisus; some secreting a fragrant volatile oil, others destitute of all trace of such a substance

So many modifications of structure are found among these plants, that although they may be generally defined as being polypetalous exogens with definite perigynous stamens, and a superior simple carpel, changing to a legume, yet each of these characters disappears in certain species, so that none are free from exceptions. For instance, Ceratonia has no petals, the stamens are indefinite and hypogynous in Mimosas, and the fruit is not a legume in Dipterix and many others. Nevertheless, as one or other of the above characters is always present, although the others may be absent or deviated from, there is but little practical difficulty in determining if a plant belongs to this order

The species amount to some thousands, and are conveniently divided into three suborders, *Papilionaceæ*, *Cæsalpinieæ*, and *Mimoseæ*.

Papilionaceæ have what are called papilionaceous flowers, that is, of the five petals one is large, broad, spread open, and called the *standard*; two others are parallel, convex, or slightly spreading, and called *wings*; and the two remaining ones are also parallel, but united by their anterior edge so as to form a body not unlike the *keel* of a boat, after which it is named. In all these plants the stamens are definite in number, and inserted with tolerable distinctness into the calyx; but while many are diadelphous, others are monadelphous or decandrous; the fruit is either a legume, a lomentum, or a drupe, or some form intermediate between the first and last. It is here that the great mass of the order occurs, especially in the colder parts of the world. Peas, beans, clover, saintfoin, lucerne, liquorice, indigo, medicks, and trefoils, lupines, and numerous other common European genera, belong to Papilionaceæ.



Indigofera Anil.

1, Standard; 2, wings; 3, keel of the flower; 4, calyx; 5, diadelphous stamens; 6, legume.

Cæsalpinieæ have the petals spread out, and nearly equal sized, with distinct unequal stamens; they may be considered the regular form of the order, while Papilionaceæ are the irregular form. Their fruit is usually a legume, but not always. The Cassia, which furnishes the senna-leaves of the shops, is the most interesting among them; to this suborder also belong the Tamarind and Algaroba fruits, the trees yielding logwood, Brazil-wood, Sappan-wood, &c., and Hymenæa, from which gum animi is procured.

Mimoseæ have small regular flowers collected into heads numerous often indefinite stamens, usually hypogynous, and a legume. They are unknown in cold countries in a wild state, but in the hotter parts of the world they form a strikingly beautiful portion of the vegetation. From the much greater length of their stamens, their petals, and the clustered compact arrangement of their flowers, the latter often resemble tassels of silk, of the most vivid colours, intermingled among the leaves. Their bark is usually astringent, with a frequent intermixture of gum. The gums Arabic, Senegal, Sassa, and others, are produced by different species; catechu is the extract of the astringent bark of Acacia Catechu, and rose-wood is said to be the timber of some Mimosa inhabiting the interior of Brazil. One of the most striking phenomena among the plants of this order is the excessive irritability observable in the leaves of certain species of Mimosa, such as M. pudica, sensitiva, &c., which



Cassia elongata.

are hence called sensitive plants. It is however a special peculiarity, and not one of general occurrence; unless the folding up at night of the leaves of the whole suborder be regarded as an instance of the same irritable quality in a low degree.



Mimosa pudica.

1, A flower, much magnified; 2, a legume.

LEIBNITZ, GOTTFRIED WILHELM, was born July 3, 1646, at Leipzig, where his father (Friedrich) was professor of jurisprudence. Having lost his father at the age of six years, he was placed at the school of St. Nicholas, in his native city, from which he was removed in his fifteenth year to the university of the same place. Although law was his principal study, he combined the legal lessons of the elder Thomasius with those of Kuhn in mathematics, and applied at the same time with great diligence to philology, history, and, in short, to every branch of knowledge. Of antient writers, Plato, Aristotle, and the Pythagoreans seem to have exercised the greatest influence on his mental character, and his profound knowledge of their writings has furnished many an element in his own philosophy, while it suggested a wish, as bold as it was impracticable, of reconciling their several systems and combining them into one consistent whole. After further prosecuting his mathematical studies at Jena under Erhard Weigel, Leibnitz returned to Leipzig, where he passed successively to the degrees of bachelor and master in philosophy. On the latter occasion (A.D. 1664) he read his treatise 'De Principio Individuationis,' in which he took the side of the nominalists against the realists. His pursuits at this time were chiefly of a mathematical and juristical character. In 1664 appeared the treatise 'Quæstiones Philosophicæ ex Jure collectæ,' which was followed in the next year by the 'Doctrina Conditionum.' The treatise 'De Arte Combinatoria' was published in 1666. This important and remarkable work contained a new method of combining numbers and ideas, and was intended to exhibit the scientific advantages of a more extensive design, of which it was only a particular application. This general design, which is sketched in the 'Historia et Commendatio Linguæ Characteristicæ Universalis' (*Posthumous Works*, by Raspé, p. 535), was the invention of an alphabet of ideas, to consist of the most simple elements or characters of thought, by which every possible combination of ideas might be expressed; so that by analysis or synthesis the proof or discovery of all truth might be possible. Notwithstanding such early proofs of his genius and talents, Leibnitz was refused a dispensation of age which he had asked for at Leipzig in order to take the degree of Doctor of Laws, which however he obtained at Altorf. His exercise on this occasion was published under the title 'De Casibus in Jure Perplexis,' which was everywhere received with approbation. Declining a professorship here offered to him, in all probability from a distaste for a scholastic life, he proceeded to Nürnberg, where he joined a society of adepts in the pursuit of the philosopher's stone, and, being appointed secretary, was selected to compile their most famous works on Alchemy. For such an occupation he is said to have proved his fitness by composing a letter, requesting the honour of admission, so completely after the style of the Alchemists, that it was unintelligible even to himself. From these pursuits he was removed by the Baron Von Boineburg, chancellor to the elector of Mainz, who invited him to proceed to Frankfort in the capacity of councillor of state and assessor of the chamber of justice. He here composed the valuable and important essay 'Nova Methodus docendi discendique Juris, cum subjecto catalogo desideratorum.' At this time Leibnitz began to prosecute the study of philosophy with greater energy, and to extend his fame to foreign countries by the republication of the work of Nizolius, 'De veris Principiis et vera Ratione Philosophandi,' to which he contributed many philosophical notes and treatises. To this date belong two original compositions which are remarkable for their boldness of views, and as containing the germ of his later philosophical system. Of these two works, the 'Theoria Motus Concreti' was communicated to the Royal Society of London, and the 'Theoria Motus Abstracti' to the Academy of Sciences of Paris. The latter city he first visited in 1672, in company with the son of his patron, and there formed the acquaintance of the most learned and distinguished men of the age; among others, of Malebranche, Cassini, and Huyghens, whose work on the oscillation of the pendulum attracted Leibnitz to the pursuit of the higher mathematics. Leibnitz next proceeded to London, where he became personally acquainted with Newton, Oldenburg, Wallis, Boyle, and others, with many of whom he had previously maintained an active correspondence. Upon the death of the elector of Mainz, he received from the duke of Brunswick Lüneburg the appointment of hofrath and royal librarian, with permission however to travel at pleasure. He accordingly visited London a second time, in order to make known his mathematical studies and to exhibit his arithmetical machine. This machine, either an improvement of that of Pascal, or an original invention, is described in the first volume of the 'Miscellanea Berolinensia,' and is still preserved in the museum at Göttingen. From London Leibnitz returned to Hanover, where he was engaged in arranging the library and in the discovery and development of the method of in-

finitesimals, which was so similar to the method of fluxions of Newton as to lead to a bitter dispute between the admirers of these great men, and ultimately between themselves, as to the priority of discovery. To decide this dispute the Royal Society of London, at the request of Leibnitz, nominated a commission, which decided in favor of Newton. [FLUXIONS; COMMERCIUM EPISTOLICUM.] There is little doubt however that the two methods were equally independent and original; but if the two claims are irreconcilable, the priority of publication gives the presumption in favor of Leibnitz. To this period belong also the important works of a mixed historical and political nature, 'Scriptores Rerum Brunsvicensium,' and the 'Codex Juris Gentium Diplomaticus,' the materials of which he had collected during his travels through France, Suabia, Bavaria, and Austria, which he undertook at the instance of Duke Ernest Augustus of Brunswick. In 1683 he joined Otto Mencke in publishing the 'Acta Eruditorum' of Leipzig, and from 1691 he was also a constant contributor to the 'Journal des Savans,' in which many of his most important essays on philosophy first appeared. To this period belong the composition of the 'Monadologie' and the 'Harmonie Préétablie.' In 1702 Leibnitz was appointed president of the Academy of Sciences at Berlin, which the elector of Brandenburg, afterwards Frederick I. of Prussia, had established at the instance of his queen, a princess of the house of Brunswick, and by the advice of Leibnitz himself. In 1710 the 'Theodicée' was published, with a view to oppose the tendency of the writings of Bayle; and two years afterwards the 'Nouveaux Essais sur l'Entendement Humain,' in answer to the essay of Locke. In the previous year Leibnitz formed the personal acquaintance of Peter the Great, who, at Torgau, consulted him on the best means to be adopted for the civilization of Russia, and rewarded his valuable suggestions by the title and dignity of councillor of state and a pension of 1000 rubles. Shortly afterwards, at the instance of Prince Ulrich of Brunswick, the emperor, Charles VI., elected him aulic councillor and baron of the empire; and, in consequence, he visited Vienna, where he became acquainted with the Prince Eugene of Savoy and the chancellor Count Sinzendorf. Upon the elevation of the elector of Hanover to the throne of England, Leibnitz returned to Hanover, where, after the publication of a few political and philosophical works, he expired on the 14th November, 1714. He was buried on the esplanade at Leipzig, where a monument, in the form of a temple, indicates, by the simple inscription 'Ossa Leibnitii,' the place of his burial. 'The best *éloge* of Leibnitz,' to use the words of Dugald Stewart, 'is furnished by the literary history of the eighteenth century, a history which, whoever takes pains to compare with his works and with his epistolary correspondence, will find reason to doubt whether, at the singular æra when he appeared, he could have more accelerated the advancement of knowledge by the concentration of his studies than he has actually done by the universality of his aims.'

The first object of the philosophical labours of Leibnitz was to give to philosophy the rigour and stability of mathematical science. The latter derives this character both from its formal portion, or demonstration, and also from the nature of its object-matter. With a view to the former, Leibnitz assumed the existence of certain universal and necessary truths which are not derived from science, but grounded in the very nature of the thinking soul. (*Principia Philosophiæ*, s. 30-7.) As the object-matter of mathematics may be supposed to be constructed of points or units, Leibnitz was led to the assumption of certain primary constituents of all matter. These are his famous monads, which form the basis of his system. These monads are simple substances without parts, out of which all bodies are compounded by aggregation. They are real, because without real simple principles the composite would not possess reality; and consequently, if there were no monads, nothing of any kind could exist really. These monads must not be confounded with the atoms of Democritus or Epicurus. They are real units, the grounds of all activity, or forces, and the prime absolute principles of all composite things, which may ultimately be resolved into them. Leibnitz called them metaphysical points and substantial forms. Being without parts, they are necessarily unextended, indivisible, and without figure. As such they are incapable of dissolution, and without natural decay or production, which is only possible in composite bodies. The monads therefore were created at once and momentarily, and in the same manner they must be destroyed or last for ever. Internally they admit not of change, since neither substance nor accident can penetrate what is wholly without parts. Nevertheless they must possess certain determinations or qualities, since otherwise they could not be things. Further, every monad is distinct from all others; for there cannot be two things absolutely identical and without internal difference. This proposition forms one of Leibnitz's necessary and fundamental principles, which he called the 'principle of identity of indiscernibles' (principium identitatis indiscernibilium). According to this principle all things must differ more or less, since otherwise they would be indistinguishable, for identical things are indiscernible. All created things are subject to change; consequently the monads also are constantly changing. This change however is only external, and does not operate internally; on the contrary, the outward change results from an internal principle; and this internal principle of change constitutes the essence of all force: the monads consequently are forces. Besides this principle of change every monad possesses also a certain schema of that which is changed, which, so to say, while it expresses the differences and multiplicity of the monad, yet comprises the multiplicity in unity. All natural changes proceed in gradation; consequently, while one part is changing, another remains unchanged, and the monads consequently possess a plurality of affections and relations. This transitory state, which experiences and exhibits the multiplicity of changes in the unity of the monad, is perception, which however is unconscious (sine conscientiâ). The active force, by which the change or passage from perception to perception is accomplished, is an appetite (appetitus). By its action the monads are ever attaining to new perceptions, in which their whole activity consists, and besides which nought else is in them; consequently they may be termed entelechies, as possessing a certain perfection (τὸ ἐντελἐς) and a certain self-sufficiency (αὐταρκεία), by which they are the sources of their own activity. In lifeless things perception is uncombined with consciousness; in animated, it is combined with it and becomes *apperception*. The monads endued with apperception may be called souls, and, in combination with the unconscious monads, constitute all animals; the only difference between man and the rest of animals, as between God and man, consisting in a higher degree of perfection. The unconscious perception is also found in the monads endued with apperception, when they are in a state of sleep or are stunned, for in sleep the soul is without apperception, and like the other monads. All perceptions however are closely dependent on each other; and when consequently the soul passes from sleep, the unconscious perceptions which it had during that state form the link which connects its present thoughts with the past. This fact affords an explanation of memory, and that anticipation of like results from like causes which guides the conduct of all animals. Man however is distinguished from the rest by his cognition of eternal and necessary truths; by these he rises to a knowledge both of his own and the Divine nature; and these constitute what is called reason or mind. By these necessary truths man becomes capable of the reflex art of distinguishing the subject (ego) and the object (res), and furnishes him with the fundamental principles of all reasoning, namely, the principle of contradiction and the law of sufficient reason. According to the former, whatever involves a contradiction is false, and its opposite true: the latter teaches that nothing can be true or exist, unless some reason exist why it should be as it is, and not otherwise. This sufficient reason of all necessary truths may be discovered by analysis, which arrives ultimately at the primary notions which assume the form of identical propositions, and are incapable of proof, but legitimate themselves. In the same manner all contingent truths must have an ultimate cause, since otherwise an infinite series of contingencies must be assumed in which reason would be lost. This last cause of all things and of their mutual dependence in the universe is God, who is absolute infinite perfection, from whom all things derive their perfection, while they owe their imperfection to their own nature, which, as finite, is incapable of receiving into itself infinite perfection. The Divine intellect is also the source of all eternal truths and ideas, and without God nothing could possibly be actual, and nothing could exist necessarily. God alone, as possessing infinite perfection, exists of neces-

sity; for as nothing obstructs his potentiality, he is without negation or contradiction, and is unlimited. But although the eternal truths have their reason in the nature of God, they are not therefore arbitrary or determined by the will of God. This is the case only with contingent truths. God, as the prime monad by whom all created monads were produced, is omnipotent; as the source of the ideas after which all things were created and from which they receive their nature, he is intelligent, and he also possesses a will which creates those finite things which his intelligence recognises as the best possible. These same properties of intelligence and will constitute the subject, or ego, in man, by which he is capable of perceiving or desiring. While however these attributes are in the highest degree of perfection in the Deity, in finite things they are variously limited, according to the respective degrees of perfection.

As imperfect, the activity of the created monads tends without themselves; consequently they possess activity so far as they possess clear perceptions (apperception), and are sive so far as they perceive obscurely. Of two composite substances, that is the more perfect which possesses the ground of the contingent changes of the latter: but simple substances cannot exert any influence on each other, unless by the intervention of the Deity, who, at the creation, arranged them in due co-ordination with each other. This adjustment of the monads was in accordance with certain sufficient reasons in each monad, by which the Divine will was moved to place the passivity of one and the activity of one in an harmonial relation; this sufficient reason was their comparative perfection: hence the famous principle of Leibnitz, which has been designated by the term Optimism—that of all possible worlds, God has chosen and produced the best.

As every monad stands in harmonious relation to all others, it expresses the relations of all, and is, as it were, a mirror of the universe which is represented in a peculiar manner by each. Hence the greatest possible variety is combined with the greatest possible harmony. God alone can embrace all these relations, while finite minds have only a very obscure perception of them. All in the world is full, and bound together into one continuous and coherent whole. The motion of each single monad, whether simple or in aggregation, affects all according to distance; and God therefore sees all future things, as well as present and past. But the soul is only cognizant of what is present to it; and although indeed it represents the whole universe, yet the infinity of objects surpasses its capacity, and its clearest representations are of those which immediately affect the body with which it is united. The soul pursues its own laws, and the body likewise its own; both however, by reason of the harmony established at the creation among all monads, as representatives of the universe, act in unison. The soul strives after means and ends, and works by the laws of final causes; the body, by those of efficient causes. Both species of causes are in harmony with each other. Such is the system of pre-established harmony, according to which the body and soul act independently of each other, and each as if the other did not exist, and yet nevertheless both as if they had an influence on each other. This harmonious relation of the body and soul Leibnitz illustrates by the supposition of two clocks, one of which points, while the other strikes the hour; both harmonise in their movements, but nevertheless are independent of each other.

The power and goodness of God are displayed in the whole universe, but it is in the moral world that they are chiefly visible. Between the natural and the moral worlds, or between God as creator of the mundane machine and as ruler of spirits, the strictest harmony subsists. God as architect of the world is consistent with himself as lawgiver; and agreeably to the mechanical regulation of the course of nature, every transgression is followed by punishment, as every good act is by rewards, since all is so disposed as to contribute to the good and happiness of the whole. This is the grand principle of the 'Theodicée.' In this work Leibnitz shows that God, as all-powerful, all-wise, and all-good, has chosen and created the best of all possible worlds, notwithstanding the seeming objections which may be drawn from the existence of evil. If a better constitution of things had been possible, God would have chosen it in preference; and even if another equally good had been possible, there would not have been any sufficient reason for the existence of the present world. The existence of evil is both metaphysical and physical. As to the former the antecedent will of God designed infinite good; but this was not possible, since the multiplicity of things necessarily limit each other, and this limitation is evil. But evil may also be considered as physical and moral. Physical evil is a necessary consequence of the limitation of finite things. Moral evil however was not necessary, but became a consequence of metaphysical and physical. But the less evil must be admitted for the sake of greater good; and evil is inseparable from the best world, as the sum of finite beings to whom defect and imperfection necessarily cling by nature. God therefore permitted its existence: for as the world contains a good incomparably greater than its attendant evil, it would have been inconsistent with the Divine goodness and wisdom not to have realised the best possible world, in consequence of the comparatively little evil which would come into existence with it.

A more immediate source of evil is the freedom of the human will, which however exists for the sake of a greater good, namely, the possible meritoriousness of man and his consequent adaptation to a state of felicity to be attained by his spontaneous acts. This freedom of man is intermediate between a stringent necessity and a lawless caprice. That man is free who, of several courses which in certain circumstances are physically possible, chooses that which appears the most desirable. This choice however cannot be without a motive or sufficient reason, which however is of such a nature as to incline only, and not to compel. Every event in the universe takes place according to necessity; but the necessity of human actions is of a peculiar kind; it is simply moral, and is not destructive of its contrary, and consists merely in the choice of the best. Even the Divine omniscience is not destructive of human liberty. God unquestionably knows all future events, and among these consequently the acts of all individuals in all time who act and sin freely. This prescience however does not make the contingency of human actions a necessity.

Such was the philosophical system by which Leibnitz sought to correct the erroneous opinions of his age, which had been drawn from the theory and established on the authority of Des Cartes. The broad and marked distinction which the latter had drawn between matter and mind had led to an inexplicable difficulty as to the reciprocal action of the body and soul, to get rid of which Spinosa had advanced his theory of substance, and denied or got rid of the difference. Leibnitz attempted to solve this difficulty by resolving all things into spirit, and assuming nothing but mental powers or forces. Nevertheless he has only presented the dualism of the Cartesian theory under another form; and the equal difficulty of explaining the community of action between the conscious and unconscious forces so as to account for the reciprocal influence of body and mind forced him to have recourse to the gratuitous assumption of the pre-established harmony. As to the charge of fatalism, which Dugald Stewart has objected to, his objection seems to have arisen from that antagonism of error which takes refuge from a blind necessity in irrational chance. The theory of optimism has been the subject of the satire of Voltaire; but it is not more misrepresented in 'Candide' than in the 'Essay on Man.' Pope and Leibnitz agree in the position that of all possible systems infinite wisdom must form the best; but by the coherency of all, the former understood the coexistence of all grades of perfection, from nothing up to Deity; the latter, that mutual dependence of all in the world by which each single entity is a reason of all others. By the fullness of creation Leibnitz denied the existence of any gap in the causal order of co-existent things; Pope asserted by it the unbroken series of all degrees of perfection. The Divine permission of evil Pope referred to the indisposition of the Deity to disturb general by occasional laws. There is consequently evil in the world which the Deity might have got rid of, if he were willing in certain cases to interrupt his general providence. Consequently he admits evil in the world which does not contribute to the perfection of the whole. Leibnitz however denies that God could remove the existing evil from the world without prejudice to its goodness. He moreover does not admit of the opposition of general and particular providence, but makes the general law of the universe to be nothing else than the totality of all special laws. (On this subject consult Mendelsohn, 'Kl. ph Schriften,' p. 538.)

Leibtnitz has been more principally spoken of as a metaphysician, but it should be remembered that his mathematical fame is as high among mathematicians as his

metaphysical reputation is among metaphysicians, and perhaps higher.

Of the works of Leibnitz several editions and collections have appeared. The two principal are the following: 'G. W. Leibnitii, Opp. omnia nunc primum coll. stud.' Dutens, Genevæ, 6 vols.; and 'Œuvres Phil., Lat., et Franc., de feu M. Leibnitz, pub. par. M. Raspé,' Amstelod., 1765, 4to. The 'Commercium Philosophicum et Mathematicum,' two volumes, quarto, containing the correspondence of Leibnitz with John Bernoulli, was published at Lausanne and Geneva in 1745.

LEICESTER. [LEICESTERSHIRE.]

LEICESTER, ROBERT DUDLEY, EARL OF, one of Queen Elizabeth's principal favourites, was born about the year 1531, of an antient and noble family, an account of which may be seen in the 'Biographia Britannica.' Edmund Dudley, the rapacious minister of Henry VII., was his grandfather. His father was John Dudley, duke of Northumberland, who, after attaining considerable celebrity during the reigns of Henry VIII. and Edward VI., was executed in August, 1553, for his adherence to the claims of Lady Jane Grey, who was his daughter-in-law. Robert Dudley was knighted by Edward VI.; was imprisoned at the same time and for the same offence as his father; was liberated in 1554; and was afterwards appointed master of the ordnance to Queen Mary. He had all those exterior qualities which were likely to ingratiate him with a queen; a youthful and handsome person, a polite address, and a courteous insinuating behaviour: and Elizabeth was no sooner on the throne than she bestowed upon him a profusion of grants and titles. He received from her lordships, manors, and castles: he was made master of the horse, a privy-counsellor, a knight of the garter, high-steward of the University of Cambridge, baron of Denbigh, and earl of Leicester; to which other dignities were subsequently added. Leicester was continually in attendance at court, and the queen delighted in his society. At an early age he had married Amy, the daughter of Sir John Robsart. In 1560 this lady died suddenly at Cumnor under suspicious circumstances, murdered, as many supposed, at the instigation of her husband, who, seeing no bounds to the queen's friendship for him, found his wife an obstacle to his ambition. The queen admired him, trusted him, and allowed him great influence; she also projected a marriage for him, but it was not with herself. She proposed him as a husband for Mary, Queen of Scots. We doubt however whether the offer was sincerely made, and whether, if other parties had been willing, she would have given her consent. It is scarcely necessary to say that the union did not take place; and that Leicester, continuing to reside at court, played his part with the queen with consummate dexterity and cunning. During this residence he engaged in an intrigue, or, as some writers say, a marriage with the widow of Lord Sheffield, who bore him a son, to whom he bequeathed the bulk of his property in a will which designated him his *base* son. Lady Sheffield afterwards narrowly escaped death from some poison that was administered to her, and being menaced by the earl of Leicester, consented to marry Sir Edward Stafford. Whether Leicester caused the poison to be given cannot be ascertained, but it is certain that his anxiety to destroy all connexion with himself was the cause of his promoting her marriage. It would have been most dangerous to his ambition that the queen should hear of his intrigue, and he was successful in concealing it. His favour continued, and the queen was prevailed upon to visit his castle at Kenilworth, in Warwickshire, where he entertained her for many days with pageants and feasting, prepared in a style of magnificence unequalled even in those days. (Strype's *Annals*.)

It is not surprising that Leicester, on account of the undue eminence to which he had risen, should have been odious to Cecil, Essex, and many of the principal English nobility; neither can it be wondered at that the foreign ambassadors who came to treat for the hand of the queen should have felt hostility towards a courtier who, aspiring to be her suitor himself, was known to be adverse to her making a foreign alliance. To undermine his power was the interest of many persons; and it was with this view that Simier, the ambassador of the duke of Anjou, acquainted Elizabeth with a fact which had been hitherto concealed from her, namely Leicester's marriage with Lady Essex. The queen was violently angry when first the disclosure was made, and threatened to commit him to the Tower; she relented however, and again received him at court with undiminished esteem. There were other persons to whom, for other reasons, Leicester's marriage was likewise a source of anger. There were suspicions that foul means had been resorted to for its accomplishment. These suspicions, as in the previous cases, could not be proved; for such inquiries as were not suppressed through fear were foiled by artifice; but considering Leicester's character, they were warranted by the facts. He had become enamoured of Lady Essex during her husband's life-time Lord Essex died suddenly of a peculiar sickness which could not be accounted for, and two days after his death Leicester was married to his widow. Accusations for this and other offences were not only made in private, but attacks against him were published in a book entitled 'Leicester's Commonwealth,' which the queen caused her council to contradict upon her own personal knowledge and authority.

In 1585 Leicester took charge of some forces sent to the Low Countries, and was invested with great powers for the settlement of some differences that had arisen there: he sailed in December, and was received at Flushing with great pomp. He was unfit however for a military commander, and so fully manifested his incapacity while opposing the troops of his experienced adversary the Prince of Parma, that on his return to the Hague the States expressed their dissatisfaction at his tactics, and suspicions of his fidelity. He returned to England in November, 1586. [BARNEVELDT.]

It was at the time of his arrival that Elizabeth was anxious to determine what course to pursue with her prisoner Mary, Queen of Scots. When Leicester was consulted, it was his advice that she should be privately put to death, a recommendation which somewhat strengthens the suspicions of him which had been previously entertained. In 1587 he returned to the Low Countries with a considerable force, both horse and foot, and was received with honours, but before long fresh quarrels arose between him and the States; he was again accused of mismanagement, and the queen recalled him after an absence of five months

In 1588 he was appointed lieutenant-general of the infantry mustered at Tilbury Fort for defence against the Spaniards. This was the last trust conferred upon him He was seized with illness at his house at Cornbury, in Oxfordshire, which he had visited on his road to Kenilworth, and died on the 4th of September, 1588. His body was removed to Warwick for interment.

'Leicester,' says Mr. Hume, 'was proud, insolent, interested, ambitious; without honour, without generosity, without humanity. Neither his abilities nor his courage were worthy of the trust that was reposed in them. His dexterity as a courtier was remarkable; and he is a rare instance of a favourite maintaining a long and uninterrupted ascendency until the end of his life.'

After the fashion of the age, he gave lands for charitable endowments, and the hospital of Robert, earl of Leicester, at Warwick, still remains as a monument of his liberality, or perhaps only of his vanity and conformity to the practice of his times. (*Biog. Brit.*; Aikin's *Elizabeth*; Hume's *Hist.*, &c.)

LEICESTERSHIRE, an English county, bounded on the north by Nottinghamshire, on the north-east by Lincolnshire, on the east by Rutlandshire, on the south-east by Northamptonshire, on the south-west by Warwickshire, and on the north-west by Derbyshire. It is included between 52° 24′ and 52° 59′ N. lat., and between 0° 39′ and 1° 37′ W. long The greatest length is, from north by east to south by west, from the junction of the three counties of Nottingham, Leicester, and Lincoln, to the neighbourhood of Lutterworth, 44 miles; its greatest breadth, at right angles to the length, is, from the neighbourhood of Ashby-de-la-Zouch to that of Rockingham, 40 miles. The area is estimated at 806 square miles. The population, by the census of 1821, was 174,571; in 1831 it was 197,003, showing an increase in ten years of 22,432, or about 12·5 per cent., and giving 244 inhabitants to a square mile. In size it is the twenty-eighth of the English counties, ranking between Nottinghamshire and Westmoreland; in population the twenty-sixth, ranking between Worcestershire and Northamptonshire; in density of population it is the twelfth, ranking between Somersetshire and Yorkshire. Leicester, the county-town, is on the river Soar, about 90 miles in a direct line north-north-west of London, or 98

miles by the road through St. Alban's, Dunstable, Stony Stratford, Northampton, and Market Harborough. A detached portion of Derbyshire near Ashby-de-la-Zouch is surrounded on three sides by Leicestershire, and on the fourth side by Warwickshire and Staffordshire.

Surface and Geological Character.—The surface of Leicestershire consists almost entirely of gently rising hills. The north-eastern part is occupied by the southern extremity of the Kesteven Cliffe Row, which extends through a considerable part of Lincolnshire, and skirts the basin of the Trent and of the Upper Witham. These hills overlook the vale of Belvoir, which is partly in Leicestershire and partly in Nottinghamshire. The south-eastern portion of the county, from Owston, not far from Melton Mowbray, to Lutterworth, is occupied by the hills which separate the basin of the Soar from that of the Welland. The north-western portion, between Mount Sorrel, Loughborough, Ashby-de-la-Zouch, Market Bosworth, and Leicester, constitutes the district which, though now bare of wood, retains its antient designation of Charnwood Forest. This district is occupied by a group of hills of inconsiderable elevation, but of a rugged character, with distinct, sharp prominences. Bardon Hill, between Leicester and Ashby, is the most elevated point of the group, and commands probably a greater extent of landscape than any other point in the island. In one direction Lincoln Cathedral, distant sixty miles, forms a prominent object in the horizon; in another direction, with a good glass, the Dunstable Hills, distant nearly eighty miles, may be seen. The Malvern Hills in Worcestershire, the Wrekin in Shropshire, and even some eminences in North and South Wales, are distinguishable. The Derbyshire Hills, to the highest point of the Peak, are also visible. Right lines described from the extremities of the view would include nearly one-fourth part of England and Wales. The height of Bardon Hill is 853 feet above the level of the sea.

Some portions of the east side of Leicestershire are occupied by the formations which constitute the third or lowest system of oolites. The great oolite extends over the summit of the sandy hills which overhang the vale of Belvoir. From beneath the great oolite the beds which intervene between it and the lias crop out: they skirt the vale of Belvoir, and occupy the border of the county toward Rutlandshire. The lias occupies the rest of the eastern side of the county, skirting the valley of the Soar at the distance of two to three miles eastward from that river. The rest of the county, with the exception of Charnwood Forest, the coal-fields near Ashby-de-la-Zouch, and some isolated hills of mountain limestone to the north-west of Charnwood Forest, is occupied by the newer red or saliferous sandstone. The Ashby coal fields lie one to the north-east, the other to the south-west of the town, and extend into Derbyshire. The south-western field is of an oblong figure, extending north-west and south-east about eleven miles. The strata dip in different directions. More than twenty coal-works have been opened in this field, the deepest of which is sunk 738 feet. One of the coal-beds has a thickness of 17 to 21 feet. The other coal-field is also oblong, and extends in the same direction as that just mentioned: its length is about six or seven miles. The isolated beds of mountain limestone are quarried at the village of Osgathorpe near Ashby, at a spot near the road from Ashby to Loughborough, and in other places. Charnwood Forest district is occupied by rocks of the transition series, sienite, greenstone, and slate. Some of these rocks are quarried under the name of granite. This district yields coarse slate for roofing and other common purposes. Gypsum is quarried near Leicester; and limestone, which makes excellent cement for works under water, at Barrow-upon-Soar. Freestone for building and clay for bricks are procured in several parts of the county.

Hydrography and Communications.—The county is chiefly included in the basin of the Trent, which just touches the county, and for a few miles divides it from Derbyshire. The principal tributary of the Trent belonging to this county is the Soar, which is formed by the junction of several small streams that rise near the south-western border of the county between Hinckley and Lutterworth. It forms a crescent, the line joining the extremities of which runs north and south, from the heads of the river to its junction with the Trent below Kegworth. In the lower part of its course the Soar forms the boundary between Nottinghamshire and Leicestershire: the upper part belongs wholly to Leicestershire. It was antiently called Leire, from which the town and county of Leicester derive their name. This river has a gentle current: it is navigable for about seven miles from its junction with the Trent to the neighbourhood of Loughborough; a canal continues the navigation up to that town. The length of the Soar is nearly forty miles.

The Wreak is a tributary of the Soar. It is reputed to rise at Ab Kettleby, near Melton Mowbray; but the true head is near Oakham in Rutlandshire, from whence it flows in a winding channel to Melton, below which it receives the short stream from Ab Kettleby: before this junction it is called Eye, or Eie. It then flows into the Soar near Mount Sorrel, after a course of about twenty-five miles. Its channel, so far as it is navigable, forms part of the Leicester and Melton Mowbray Navigation.

The Anker skirts the border of the county for two or three miles near Atherstone in Warwickshire: it joins the Tame, a feeder of the Trent, at Tamworth.

The Sence rises in Charnwood Forest, and flows south-west fourteen miles into the Anker near Atherstone.

The Mease, a feeder of the Trent, which rises just within the border of Derbyshire, has a small part of its course in this county; it flows by Ashby, and in two places separates Leicestershire from the detached part of Derbyshire.

The Deven, which joins the Trent at Newark, has its source in Croxton Park in this county: the Smyte, or Smite, which waters the vale of Belvoir, rises just within the county, near Nether Broughton. These are all the streams belonging to the system of the Trent which claim notice.

The Avon, a tributary of the Severn, forms the boundary of the county for seven or eight miles on the southern side, separating it from Northamptonshire. The Swift, a small stream which flows by Lutterworth, falls into it.

The Welland, which rises just within Northamptonshire, forms, for sixteen or eighteen miles, the boundary between that county and Leicestershire. A small feeder of the Welland divides, for about seven miles, the counties of Leicester and Rutland.

Leicestershire has several canals. The Leicester Navigation consists partly of a canal, and partly of the river Soar made navigable. It extends from Loughborough (where it is connected with the canal already mentioned from the navigable part of the Soar to that town) to the town of Leicester. Its length is about eleven miles: the rise in that distance is forty-five feet. It affords a conveyance for the limestone and granite (so called) of the neighbourhood.

The Leicester and Melton Mowbray Navigation commences at the junction of the river Wreak with the Leicester Navigation, and is carried along the channel of the Wreak and Eye, which are thus made navigable, to Melton. The length of this navigation is about eleven miles.

The Leicestershire and Northamptonshire Union Canal extends from the Leicester Navigation at Leicester, to Foxton near Market Harborough, with a cut from Foxton to Harborough. It is carried for the first two or three miles along the bed of the Soar. Its whole length is about seventeen miles: or, including the branch to Harborough, twenty-one miles. At Saddington there is a tunnel half a mile long, through which the canal passes. The rise in the canal is about one hundred and twenty feet from Leicester to the tunnel at Saddington.

The Grand Union Canal forms a communication between the Grand Junction Canal, at Long Buckby in Northamptonshire, and the Leicestershire and Northamptonshire Union Canal at Foxton. Its whole length is nearly forty-five miles, of which about eight are in Leicestershire. In the Leicestershire part there are a tunnel and a short branch canal to Welford in Northamptonshire.

The Oakham Canal runs from Oakham in Rutlandshire to Melton Mowbray, where it unites with the Leicester and Melton Mowbray Navigation. Its whole length is about fifteen miles, of which more than half is in Leicestershire.

The Ashby-de-la-Zouch Canal commences in the Coventry Canal, about three miles from Nuneaton in Warwickshire, and runs to the coal-field south-west of Ashby. Its whole length is above twenty-six miles, of which twenty-one are in Leicestershire or in the detached portion of Derbyshire. It is on one level throughout. It is principally used for the conveyance of the coal and lime procured in the neighbourhood of Ashby. There are three railways connected with this canal

at the Ashby end; one from the Ticknall lime-works, eight miles and a half long, carried in one place through a tunnel; a second branching off from this to the Cloudhill lime-works, four miles and a quarter long, with two short branches; and a third from a colliery near Moira, to the canal, half a mile long

There is a railway fifteen miles and three-quarters long from Leicester to Swannington near Ashby, formed for the purpose of conveying coal and lime from the works in that neighbourhood for the supply of Leicester. The quantity of coal conveyed on it in 1835 was 135,000 tons. A railroad called 'the Midland Counties Railway,' for which an act was obtained in 1836, is now in progress. It branches off from the London and Birmingham railroad at Rugby in Warwickshire, about eighty miles from London, and proceeds nearly due north to Leicester, a distance of twenty miles, leaving Lutterworth to the right or eastward of the line; from Leicester it continues along the valley of the Soar by Loughborough into Nottinghamshire, in which county it crosses the Trent near its confluence with the Soar, and then by two arms runs to Nottingham and Derby. The length from Rugby to Nottingham is forty-seven miles and a quarter; from Rugby to Derby above forty-nine miles; from Nottingham to Derby the distance is fifteen miles and a quarter.

The principal coach roads through the county are as follows:—The Chester and Liverpool mail-road enters the county from Northamptonshire, near the village of north Kilworth, and runs through Lutterworth and Hinckley to the neighbourhood of Atherstone, where it enters Warwickshire. The Leeds mail-road enters the county from Rutlandshire, and runs through Melton Mowbray into Nottinghamshire. The Halifax mail-road enters the county from Northamptonshire, and passes by Market Harborough, Leicester, and Loughborough, into Nottinghamshire. The Portpatrick, Carlisle, and Manchester mail-road coincides with the Halifax road as far as Loughborough, from which town it runs by Kegworth to Derby. Roads lead from Leicester by Melton Mowbray to Grantham; by Bingham in Nottinghamshire to Newark; by Ashby-de-la-Zouch to Burton-on-Trent; to Hinckley; to Lutterworth; and to Uppingham in the adjoining county of Rutland.

Agriculture.—The climate of Leicestershire is mild and genial, without being so moist as in those counties which lie nearer the Atlantic. There are few high hills to intercept the clouds. The soil is loamy, without the extremes of stiff clay, loose sand, or chalk. It varies in fertility according to its texture, depth, and freedom from superfluous moisture. The most fertile soils are almost invariably kept in pasture, for which this county is pre-eminent; the poorer and thinner soils only, which are not so well adapted for grass land, being kept in arable cultivation. Out of above 500,000 acres of surface, fully one half is in permanent grass. The quantity of woods or wastes is very small.

There are many large landed proprietors who have family seats in this county, and they have in general some portion of their domains in hand. By employing intelligent bailiffs they greatly contribute to the improvement of husbandry. Grazing and breeding cattle and sheep is the chief object of the Leicestershire farmers, and they have succeeded admirably both with oxen and sheep. The success of Mr. Bakewell, of Dishley farm, and some others, has contributed greatly to excite a spirit of emulation in the breeders, and to make them attentive to keep up the good qualities of the breeds, and to prevent their degenerating by injudicious crosses. The arable land has however not been neglected; and the quantity of stock kept, for which artificial food must be provided in winter, has not only supplied abundant manure to recruit the land, but also made the cultivation of turnips, potatoes, cabbages, and green crops more general and extensive than in many other counties, which cannot fail to improve the crops of corn sown after these, and to keep the land in a productive state.

The plough in common use has two wheels fixed to the end of the beam, which is like that of a common swing plough, the horses drawing the plough by the beam. This is better than the arrangement of carriage of a common wheel plough, where the beam only rests upon it without being fixed. This plough, which is generally used in the midland counties, and is known by the name of the Rutland plough, when properly set requires no one to hold the stilts after it is once entered into the furrow, but will eep its depth and direction, provided the horses keep their proper course. Most of the improved modern instruments, such as scarifiers, spiked rollers, and drills, have been introduced, and are used in the larger farms, which are chiefly in the hands of the proprietors. In many parts of the county the occupations are small, not exceeding 100 acres, where the farmer holds the plough himself, and his family do most of the work of the farm. The course of crops of the grazier, breeder, or principal farmer is very commonly as follows:—On good friable loams, 1, a green crop to clean the land, turnips, rape, or cabbages; 2, barley, with clover and grass seeds; 3 and 4, clover mown and pastured; 5, oats or wheat. This is a very good rotation, if the clover be only sown every second course, or be mixed with a considerable proportion of rye grass, trefoil, and other grasses; for the clover will fail if it recur too often. On a good heavy loam the following has been observed: 1, beans drilled; 2, wheat; 3, green crops; 4, barley and seeds; 5 and 6, grass. This is an excellent rotation, the manure being put on for the beans and green crops.

The natural meadows along the banks of the rivers are considerable, and most of them of excellent quality. On the banks of the Soar, near Leicester, is a considerable tract of excellent meadow land, apparently formed by the deposition of the sediment of that river, which still inundates it occasionally, and keeps up the fertility. The upland meadows are very good also, but require to be manured occasionally. The produce in hay is from one and a half to two tons per acre.

There are considerable dairies in Leicestershire, especially on the borders of Derbyshire; and very good cheese is made there. The cheese known by the name of Stilton is chiefly made in Leicestershire, and has obtained its name from having been first noticed at an inn in Stilton. It is a very rich cheese, in which a great portion of cream is added to the milk in the making. It requires great nicety in the management, to bring it to a proper state of maturity, and keep a rich mild flavour in it. Every dairy-woman has her own secrets, which she does not readily communicate; and hence attempts to imitate Stilton cheese are seldom successful. That it can be made elsewhere is proved by that which goes by the name of Windsor Forest cheese, which is superior to most of the cheese which is sold as Stilton, and is eagerly purchased at two shillings the pound. [CHEESE.] In a good dairy, a cow is reckoned to make, on an average, 4 cwt. of cheese in the year, and to require for her keep summer and winter 3 acres of land. Four cows will fatten a pig of 40 lbs. to 12 score, which is an increase of 50 lbs. for each cow, besides the cheese and the calf. This will altogether afford a rent of 30*s*. to 40*s*. per acre. An acre of good sheep pasture will keep, during the summer, two ewes and their lambs and two wethers, and, with a quarter of an acre of green crops, during the winter also. Thus 80 sheep may be bred and fatted upon 50 acres of land. This will likewise afford a rent of about 30*s*. per acre.

A great portion of the low pastures has been much improved by draining; some were drained by Elkington himself, and at considerable expense; but the increased value of the land amply repaid the outlay. In consequence of the demand for streams to turn mills, wherever there is any fall, the irrigation of meadows is not carried on to the extent it might be. Mr. Bakewell and several other enterprising farmers have however irrigated extensively, and with great advantage.

The principal breed of cattle in Leicestershire is the improved long-horn, which owes its high character to the intelligence, activity, and perseverance of Mr. Bakewell of Dishley farm near Loughborough. [CATTLE.]

The sheep, for which this county is also renowned, equally owe their superiority to the same individual. They are large, with very long wool, and fatten very readily at an early age. All these qualities render them valuable in good pastures, which they require. [SHEEP.]

In a county where the amusement of fox-hunting is followed with great eagerness, it may be expected that many good horses are bred, and the rich pasture favours the rearing of this useful and noble animal. Many well-bred horses are annually sold by the breeders, and realise great prices; but the risk in breeding high-bred horses is very great, and unless carried on extensively, is seldom very profitable. Good useful cart-horses are a safer speculation; they are easily reared, come soon to market, and are less liable to accidents and diseases.

Hogs have been improved in Leicestershire, as well as

other animals. This has been done chiefly by crossing with foreign breeds, such as the black Neapolitan and the Chinese. The Dishley swine are small boned, compact, and get extremely fat. There are larger breeds, but the middle-sized are, on the whole, the most profitable.

The following are the principal fairs in Leicestershire:—Ashby-de-la-Zouch, Easter Monday, (a show for stallions); Tuesday for horses; Whitsun-Tuesday, horses, cows, and sheep; Belton, Monday after Trinity week; Castle Donnington, March 18, Whit-Thursday, September 29; Hallaton, Holy Thursday; Hinckley, third Monday after January 6, Easter Monday, Monday before Whit-Monday, Monday after August 26, October 28; Husband-Bosworth, October 15; Leicester Old Fairs, March 2, May 12, July 5, October 10, December 8; New Fairs, January 4, June 1, August 1, September 13, November 2; Loughborough, February 14, March 24, 28, April 25, Holy Thursday, August 12, September 30, November 13; Lutterworth, February 16, Holy Thursday, April 2, September 16; Market Bosworth, May 8, July 10; Market Harborough, January 6, February 16, April 29, July 31, October 19; Melton Mowbray, Monday and Tuesday after January 17, March 13, May 3, Whit-Tuesday, August 21, September 12; Waltham-on-the-Would, September 19.

Divisions, Towns, &c.—Leicestershire is divided into six hundreds, as follows:—

Name.	Situation.	Area. Acres.	Pop. in 1831
West Goscote	N.W. and Central	90,520	86,216
East Goscote	Central	79,830	18,770
Framland	N.E.	87,540	17,197
Gartree	S.E.	80,740	17,059
Guthlaxton	S.	63,980	22,591
Sparkenhoe	W.	108,730	35,170
		511,340	197,003

It contains the borough, market, and county town of Leicester; and the market-towns of Ashby-de-la-Zouch, Market Bosworth, Market Harborough, Hinckley, Loughborough, Lutterworth, Melton Mowbray, and Mount Sorrel. Of Ashby and Bosworth an account is given elsewhere; of the others an account is subjoined. [ASHBY-DE-LA-ZOUCH; BOSWORTH, MARKET.]

Leicester is on the right bank of the Soar. It was known to the Romans by the name Ratæ, and was then a place of importance. Its name Leicester (supposed to have been Caer Leirion in the time of the Britons, and altered by the Saxons to Lege-Cestria and Legeocester) is derived from the river Leire, now Soar. Geoffrey of Monmouth ascribes its name and foundation to the fabulous Leir, the son of Bladud, the Lear of Shakspeare. It was a place of importance under the Saxons, but its history is uncertain. It appears to have been the seat of a bishop's see transferred hither from Sidnaceaster. It was taken and many of the inhabitants massacred by Ethelfrith, king of Northumberland. It was also taken by the Danes, and was one of the five Danish burghs, or commonwealths, which filled up with their dependent territories that part of the Danelagh, or Danish portion of the island, which intervened between Northumbria and East Anglia. Being recovered, it was repaired and fortified anew and enlarged by Ethelfleda, daughter of Alfred the Great in the time of Edward I. (the elder). After the Conquest, it was added to the royal demesne, and a castle was erected, or rather an older fortress was enlarged and strengthened, to keep the townsmen in check. On the Conqueror's death this castle was seized by the Grentemaisnells, and held by them for Duke Robert of Normandie; it was therefore attacked and reduced to a heap of ruins by William Rufus. In the following reign the castle was repaired; and in the civil wars of Henry II. was, as well as the town, taken by the king's forces from the adherents of his rebellious sons. Both town and castle were nearly destroyed. The castle, having been granted to the earls of Lancaster, rose from its ruins; and during the reigns of the Lancasterian princes was frequently a royal residence, and parliaments were held in it. On the overthrow of that dynasty it went to decay. In Charles I.'s time the materials were sold, and there are now few remains of it, except the mound or earthwork of the keep, in the neighbourhood of which are some old buildings called 'the Newark,' or new works, probably to distinguish them from the castle or old works.

Leicester had a mint, in which were produced a succession of coins from the time of the Saxon Athelstan to Henry II. There were several religious houses or hospitals, among which the most important was the abbey of St. Mary Pré or De Pratis, founded for Black or Augustinian canons, by Robert Bossu, earl of Leicester, A.D. 1143. Its revenue at the dissolution was 1062*l.* 0*s.* 4*d.* gross, or 951*l.* 14*s.* 5*d.* clear. Of this great and wealthy establishment, to which, from its being the scene of Cardinal Wolsey's death, considerable interest attaches, little more than a mass of shapeless ruins remains. During the civil wars of Charles I., Leicester, which was occupied by the Parliamentarians, was taken by storm by the king, May 31, 1645, but was recovered on the 18th June, in the same year, by the Parliamentarians under Fairfax.

The borough of Leicester and its liberties comprehend an area of 3960 acres, with a population, in 1831, of 38,904. The liberties, in which the borough and county magistrates previously exercised conjoint jurisdiction, have been by the Boundary and Municipal Reform Acts incorporated with the borough both for parliamentary and municipal purposes. The borough, thus enlarged, has been divided into seven wards, and has a corporation of fourteen aldermen and forty-two councillors.

The town is irregularly laid out; the principal line of street extends from north to south nearly a mile in length. The houses are for the most part of red brick. There are several churches, of which the most antient is St. Nicholas, which is partly built of the bricks from an adjacent Roman wall, of which a fragment, called the Jewry wall, remains; and from the resemblance of some arches of the church to those of the wall, it has been supposed that some portions of the same edifice to which the Jewry wall belonged, or of an edifice of about the same date, have been built into the church. The church, which consists of a nave, chancel, and south aisle, has a square western tower between the nave and chancel, and is chiefly of Norman architecture. St. Mary's church is a large building, partly of Norman, partly of Early English architecture, with some inserted portions of later date: it has a western tower surmounted with a lofty and elegant spire rebuilt in the last century. The various styles in which this church is built are admirably executed; some of the arrangements are very singular. There are, close to the church, a gateway in the Perpendicular style, leading into an area called the castle yard: and a large room, formerly serving as a court-hall and banqueting-room to the earls of Leicester and the dukes of Lancaster, and now used for the assizes and county business. The church of St. Martin is an antient cross church, partly of Early English and partly of Perpendicular architecture: a tower, the lower part of which is Norman, rises from the centre, surmounted by a crocketted spire, which, as well as the upper part of the tower, is of later date. This church is the largest in Leicester; it was converted into a barrack by the Parliamentarian soldiers during the civil war, and has since been frequently occupied by public meetings. All Saints is a small church; the chancel is of modern erection, but the rest is antient, and chiefly in the Early English style, with some later insertions. St. Margaret's is a handsome church, partly Early English, with a chancel and a lofty tower of Perpendicular character. There are some portions of good work in the Decorated style. There is a distinct church in St. Margaret's parish, dedicated to St. George, lately erected in the Perpendicular style.

There are four bridges over the Soar.

The guildhall is a commodious building; the borough gaol and house of correction are new buildings, erected on or near the site of the former county gaol, but are insufficient for the proper classification of the prisoners. A new county gaol and house of correction have been built on the south side of the town. Wigston's hospital or almshouse is an antient building, with some good Perpendicular work both in stone and wood. There are a theatre, and a range of assembly rooms, which were originally built for an hotel, and have their ceiling and walls richly painted. The New Walk is a promenade on the south-east side of the town, planted with trees and commanding some pleasant prospects.

The staple manufacture of the town is stockings, which probably employs 3000 persons. Lace making is carried on to some extent, and probably employs 500 persons. Wool-combing employs nearly 150; dyeing above 200; and several hands are employed in the manufacture of the frames or other machinery required by the stocking-weavers. The

market is on Saturday, and is well supplied. In the market-place, which is too small for the business done, is a building called the Exchange, where the town magistrates hold a weekly meeting and transact business.

There are races held yearly; and of late years a triennial musical festival has been established.

There are in Leicester six parishes, besides some extra-parochial districts; but the parish of St. Leonard's is united for ecclesiastical purposes with St. Margaret's. The vicarage is held by 'a sequestrator,' and is of the clear yearly value of 40*l*. The other parishes are vicarages, the clear yearly values of which are as follows:—All Saints, 148*l*.; St. Margaret, 440*l*.; St. Martin, 140*l*.; St. Mary, 221*l*.; and St. Nicholas, 85*l*. The perpetual curacy of the district church of St. George is of the clear yearly value of 100*l*. Only All Saints and St. Margaret have glebe-houses. The churches have been noticed already. There are several dissenting meeting-houses, and one chapel for Catholics.

There were in the borough and liberties, in 1833, three infant schools with 477 children, six dame schools with 156 children, two Lancasterian schools with 570 children, a national school with 245 children, two parochial or other free schools with 220 children, an endowed grammar-school with 18 or 20 children, two day and Sunday schools with 382 children, nine day-schools with 318 children, a boarding and day school with 30 to 40 children, and twenty-four Sunday-schools with 3577 children. Besides these institutions there was 'the Female Asylum,' in Newark liberty, where from 10 to 16 girls between the ages of thirteen and sixteen were received for three years, clothed, maintained, and instructed. Two proprietary grammar-schools, or 'colleges,' have been since established. There are several hospitals or almshouses, especially Trinity hospital containing ninety inmates, and Wigston's hospital for twenty-six. There are also an infirmary or county hospital, and a lunatic asylum.

The assizes and quarter-sessions for the county are held here; it is also the place of election and one of the polling-stations for the southern division of the county. Leicester has returned two members to parliament since the time of Edward I. The magistrates of the borough hold quarter-sessions, and have a court of record for the recovery of debts.

Market Harborough appears by the remains of an encampment and by various antiquities that have been dug up to have been occupied by the Romans. It is in Gartree hundred, on the Carlisle mail-road, 83½ miles from London, and 14½ from Leicester. The town is in the parish of Bowden Magna, which has an area of 3120 acres, with a population in 1831 of 3346, of which the chapelry of Market Harborough contained 2272. The town however extends beyond the chapelry into the parishes of Bowden Magna and Bowden Parva (the latter in Northamptonshire). It stands on the north bank of the Welland, and consists of one principal street and several smaller ones. In the principal street is a town-hall, built by a former earl of Harborough; the under part is occupied as shops, the upper is used by the county magistrates for their official business. The chapel is large and one of the finest ecclesiastical buildings in the county. It consists of a nave, two aisles, and chancel, with a fine tower and a lofty octangular spire, crocketted. There are two or three dissenting meeting-houses. The only manufacture carried on is that of carpets. There is a weekly market on Tuesday. The chapelry is of the clear yearly value of 144*l*, with a glebe-house. There were in the chapelry in 1833 eleven dame-schools with 201 children; a day school, partly supported by endowment, with 50 children; six other day-schools with 148 children, and four Sunday schools with 388 children. There is a branch from the Leicestershire and Northamptonshire Union Canal from Foxton to Harborough. Harborough is one of the polling-places for the southern division of the county.

Hinckley is in the hundred of Sparkenhoe, on the Chester and Liverpool mail-road, 99½ miles from London and 12½ from Leicester. The town was antiently incorporated. The parish extends into Knightlow hundred, Warwickshire, and comprehends 6200 acres, with a population in 1831 of 7180. The township of Hinckley Bond, in which the town stands, contains 3190 acres, and had, in 1831, 6491 inhabitants, including the hamlet of Wykin. The church is large and antient; the roof is of beautiful old oak. There are several dissenting meeting-houses. The staple manufacture of the town is that of stockings, chiefly of coarser quality. The quantity of stockings manufactured is probably greater than in any town of the same size in the kingdom. This branch of industry employs 700 hands in the town, and many more in the adjacent villages. The market is on Monday. The living is a vicarage of the clear yearly value of 338*l*. with a glebe-house. The chapelries of Stoke Golding and Dadlington in the parish are annexed to the vicarage. There is a chapel only at Dadlington. There were in 1833, in the whole parish, one infant school with 173 children; one day-school, partly supported by subscription, with 25 children; one endowed grammar-school in Stoke Golding chapelry with 13 children, and twelve other day-schools with 385 children; two boarding and day schools with 35 children; one national school, supported by an endowment, with 130 children, and ten Sunday-schools with 1131 children. There was also a Catholic college with several students. Hinckley is one of the polling-places for the southern division of the county.

Loughborough, the second town in the county in population and importance, is 11 miles from Leicester and 109 from London on the Carlisle and Halifax mail-road. It is in West Goscote hundred. The parish comprehends an area of 5460 acres, and had in 1831 a population of 10,969: of these 4370 acres and a population of 10,800 were in the township of Loughborough. This town was of importance in the time of Leland, who says, 'The town of Lughborow is yn largeness and good building next to Leyrcester, of all the markette tounes yn the shire, and hath in it a 4 faire strates, or mo, well paved.' The prosperity of the town has much increased of late years: in 1801 the population of the parish was 4603; in 1811, 5556; and in 1821, 7494. The houses are generally built of brick. The market-place is now open, the old market-house having been lately removed. The church is a handsome building in the Perpendicular style; it has a fine tower which was built about the end of the sixteenth century. There are several dissenting meeting-houses. The chief manufactures of the town are hosiery (especially what is termed fleecy-hosiery), which employs about 900 to 1000 persons in the town and neighbourhood; bobbin-net lace, cotton goods, and shoes. The Leicester Navigation and the Loughborough Canal, communicating with the Soar, tend much to the prosperity of the town. The market is on Thursday. The living is a rectory of the clear yearly value of 1848*l*. with a glebe-house. There were in 1833 in the township of Loughborough one dame-school with 25 children; four endowed day-schools, viz. three for boys, containing respectively 250, 80, and 8 scholars, and one for girls with 108 scholars; six other day-schools with 163 children; and seven Sunday-schools with 2096 children. The endowed schools have ample funds and the course of education might be much extended. Loughborough is the principal place of election for the northern division of the county, and a polling-station.

Lutterworth is in the hundred of Guthlaxton, 13 miles from Leicester, and 89½ from London on the Chester and Liverpool mail-road. The parish comprehends an area of 1890 acres, with a population, in 1831, of 2262. The town consists of one main street and several smaller ones. The church is a large handsome building: the chancel is separated from the nave by a beautiful screen. From the pulpit, which is of fine carved oak, Wickliffe, who held the living of Lutterworth, is said to have addressed his flock. The chief manufacture of Lutterworth is of coarse hosiery, but it is not extensive. The market is on Thursday. The living is a rectory, of the clear yearly value of 585*l*., with a glebe-house. There were in the parish, in 1833, one endowed school, with 100 boys; two other schools, partly supported by endowments and by subscription, with 10 boys and 32 girls respectively; another school, partly supported by subscription, with 26 boys; eleven other day-schools, with 171 children; and four Sunday-schools, with 486 children.

Melton Mowbray is in the hundred of Framland, 15 miles from Leicester, and 105 from London on the Leeds mail-road. The parish contains an area of 3570 acres, with a population, in 1831, of 3356, beside the chapelry of Freeby and the township of Welby, which are in the parish, and contain 2040 acres, with a population of 164. Melton owes its prosperity to its being the seat of the well-known Melton Hunt, which causes a large influx of sportsmen during the season. The town is in a valley, on the river Eye, or Wreak, and is well built. It is watched, lighted, and paved; and the three bridges in or about the town

(over the Eye, or, its feeder, the Scalford) are kept in repair from property left in trust, and called 'the Town Estate.' The church is large, and has a fine tower, partly in the Early English style. There are one or two dissenting meeting-houses. The chief manufacture is that of bobbin-net lace. The market is on Tuesday; and at every alternate market there is usually a great show of cattle. The living is a vicarage, united with the chapelries of Freeby and Welby (both in the parish), also with the chapelries of Burton Lazars and Sysonby: its clear yearly value is 580*l.*, with a glebe-house. There were, in 1833, in the parish, exclusive of Freeby and Welby, fifteen dame-schools, with 250 children; two free day-schools, supported from 'the Town Estate;' the upper school having 45 boys, and the lower school 330 children of both sexes; eight other day-schools, with 145 children; and three Sunday-schools, with 537 children.

Mount Sorrel is in the hundred of West Goscote, 7½ miles from Leicester on the road to Loughborough. The chapelry of Mount Sorrel, which is chiefly in the parish of Barrow-upon-Soar, comprehends an area of 680 acres, with a population, in 1831, of 1602. The town is in a very romantic situation, on the left bank of the Soar, as its name (Mount-Soar-Hill) imports. The extremity of a range of hills extending from Charnwood Forest overhangs the town, presenting a steep slope: it is called Castle Hill, from a fortress which antiently crowned it. This castle was occupied by the insurgent barons in the close of John's reign, and the garrison committed great depredations in the neighbourhood, until repressed by a Royalist detachment from Nottingham: the castle however was not subdued until the next reign, when it came into the hands of the king, and was razed to the ground. The town consists chiefly of one street: it is paved with 'red granite,' as it is termed, from the adjacent rocks of the Charnwood Forest group. Many houses are built of the same stone. There are a chapel and several dissenting places of worship. There is a small market-house, on the site of which formerly stood an antient cross, removed, on the erection of the market-house, to the park of Sir John Danvers. The principal manufacture is of stockings: some bobbin-net lace is also made. The market is on Monday, but is very small. The living is a perpetual curacy, of the clear yearly value of 157*l.*, in the gift of the vicar of Barrow. There were, in 1833, two day-schools with 37 children, and two Sunday-schools with 248 children.

Beside these towns there are one or two other places entitled to a brief notice. Billesdon, the market of which, held on Friday, has been discontinued within the present century, is in the hundred of Gartree, about 9 miles from Leicester, on the road to Uppingham. The parish comprehends an area of 4430 acres, with a population, in 1831, of 908. There are in the parish two chapelries, Goadby and Rolleston, included in the foregoing numbers. The church consists of a nave, chancel, and two aisles: it has a stone tower and a neat spire. There is a school, with a small endowment. There are chapels at Goadby and Rolleston: the former is antient; in the grave-yard of the latter are the remains of a neat cross. The living of Billesdon is a vicarage, with the chapelries annexed, of the clear yearly value of 279*l.*, with a glebe-house. There were in the whole parish, in 1833, three dame-schools, with 54 children; one boarding-school, with 26 children; three day-schools, with 82 scholars; and three Sunday-schools, with 166 scholars. Barrow-upon-Soar is about two miles from Mount Sorrel, on the opposite bank of the Soar, lower down the stream. The parish, which contains nearly 8000 acres, with a population, in 1831, of about 6000, includes the chapelries of Mount Sorrel, Quorndon, and Woodhouse. The village of Barrow contains an hospital, or almshouse, for six poor men, and an endowed school of 30 or 40 boys. There are two or three dissenting places of worship. Quorndon chapelry, in Barrow parish, comprehends 1990 acres, with a population, in 1831, of 1752: the stocking and bobbin-net lace manufactures are carried on to a considerable extent. The village is on the road between Mount Sorrel and Loughborough. Kegworth is on the road from Loughborough to Derby, in the hundred of West Goscote. The parish comprehends an area of 1850 acres, with a population, in 1831, of 1749, exclusive of the chapelry of Isley Walton. There was a market here, which has been discontinued within the present century. There are some dissenting places of worship. The church is a handsome light building, in the form of a cross. The tower is surmounted by a spire. Bottesford is on the river Deven, in the vale of Belvoir, in Framland hundred. The parish comprehends 5010 acres, with a population, in 1831, of 1320. The village is on the road from Grantham to Nottingham. The church is a cross church, with a tower and lofty ornamented spire, and contains a number of handsome monuments of the earls of Rutland of the Manners family. Four dukes of Rutland are buried here, but have no monuments. Belvoir Castle, the seat of the dukes of Rutland, is about four miles from Bottesford, upon the border of Leicestershire and Lincolnshire. This noble building occupies nearly the summit of a hill, on the southern slope of which are terraces and shrubberies. It surrounds a quadrangular court, and has undergone many alterations during the present century: in its situation and general appearance it bears some resemblance to Windsor Castle. It contains a very fine collection of paintings. Seleby is on the right bank of the Soar, near Mount Sorrel. It has a fine church with a handsome tower, an endowed school, and several dissenting places of worship. Syston is on the road from Leicester to Melton; it has a large church with a square tower. Both these villages are in the hundred of East Goscote, and had a population, in 1831, of 1491 and 1349 respectively. The stocking manufacture is carried on in them to a considerable extent. Wimeswould is in East Goscote hundred, near the border of the county, on the road from Leicester to Newark. The population, in 1831, was 1276; the chief manufacture is that of lace. Woodhouse is in West Goscote hundred, near Mount Sorrel; the population in 1831 was 1262; the inhabitants are engaged in the stocking manufacture. Castle Donnington, in the same hundred, is on the border of the county, on the road from Ashby-de-la-Zouch to Nottingham. The population of the parish in 1831 was 3182: about 100 of the inhabitants were engaged in manufactures. There are the remains of an old castle, from which the parish gets its name, and a noble park and mansion, the residence of the marquis of Hastings. The house is modern, built of stone round a court-yard; the architecture is Gothic. It contains a valuable collection of paintings. Sheepshead, between Ashby and Loughborough, had, in 1831, a population of 3714. The stocking manufacture gives employment to 500 hands. In the middle of the village is a stone cross, consisting of a single shaft, standing on steps. There are several dissenting meeting-houses. At Whitwick, near Ashby, in West Goscote hundred; at Great Wigston, Oadby, Blaby, Cosby, Countessthorpe, and Whetstone, near Leicester, and in Guthlaxton hundred; at Southfield in the same hundred, near Lutterworth; at Earl Shelton, Burbage, Barwell, and Sapcote, all near Hinckley, in Sparkenhoe hundred; at Thurmaston in East Goscote, and Austey in West Goscote, and at Enderby and Narborough in Sparkenhoe hundred, all near Leicester, from one hundred to three hundred stocking-weavers are employed. This constitutes, in fact, the staple manufacture of the county, and gives employment in all to upwards of ten thousand workmen, more than half of whom are at Leicester or Loughborough, or at other places in West Goscote hundred.

Divisions for Ecclesiastical and Legal Purposes.—This county is in the diocese of Lincoln and in the ecclesiastical province of Canterbury. It constitutes an archdeaconry, that of Leicester; and is divided into the six rural deaneries of Akely, Framland, Gartree, Goscote, Guthlaxton, and Sparkenhoe. It comprehended, when Burton published his 'Description of Leicestershire,' in the early part of the seventeenth century, 115 rectories, 81 vicarages, and 105 chapels, of which 33 were in ruins. At present, as near as we can collect, there are 211 benefices, viz. 115 rectories, 79 vicarages, 13 chapelries or perpetual curacies, and 4 donatives.

Leicestershire is in the Midland Circuit; the assizes and quarter sessions are held at Leicester.

Before the Reform Act, Leicestershire returned four members to parliament, viz. two for the county, and two for the borough of Leicester. By that Act the county was divided and the number of members increased, each division of the county returning two. The northern division comprehends the hundreds of West Goscote (except the borough and liberties of Leicester), East Goscote, and Framland, and two detached portions of that of Gartree. Loughborough is the place of election, and the polling-stations are Loughborough, Melton Mowbray, and Ashby-de-la-Zouch. The southern division comprises the hundreds of Gartree,

Guthlaxton, and Sparkenhoe, with the borough and liberties of Leicester. Leicester is the chief place of election; and the polling-stations are Leicester, Market Harborough, and Hinckley.

History, Antiquities, &c.—Leicestershire was antiently comprehended in the territory of the Coritani: and when the Romans had subjugated Britain and divided it into provinces, it was included in the province of Flavia Cæsariensis, which comprehended the midland and eastern parts of the island. The Romans established several stations within or near upon the limits of the county: Ratæ (Leicester); Vernometum, near Willoughby (on the road from Leicester to Newark); Manduessedum (Manceter, near Atherstone); Benonæ, or Venonæ (High Cross, between Lutterworth and Hinckley); and Tripontium, which some fix on the Avon, near Catthorpe, a village in Northamptonshire, south of Lutterworth. Of these stations however only Ratæ strictly belongs to this county. Venonæ and Tripontium are just on the border: the others lie beyond it. Ratæ, as it is termed in the Itineraries of Antoninus, otherwise 'Ράγε, or 'Ερᾶται, according to Ptolemy, and Ragæ and Ratiscorion, according to Richard of Cirencester, was on the site of the modern Leicester. Many tessellated pavements, coins, urns, and domestic and military utensils have been discovered at different times. The pavements do not display much taste or skill; most of them were found from four to six feet under the surface of the present streets. A Roman mile-stone was discovered A.D. 1771, about two miles from the town northward, on the side of the Foss-road: it is cylindrical like the shaft of a column, with a roughly carved inscription, showing it to have been set up in the time of the emperor Hadrian. It was subsequently removed into the town. The portion of Roman wall called the Jewry wall at Leicester is built of alternate courses of ragstone and brick; the masonry is very rough: there are several arches in the wall, turned entirely of tiles. To what building it belonged cannot now be satisfactorily ascertained. South of Leicester town are two remarkable parallel embankments, called the 'Raw Dykes,' extending about three furlongs in length, and about sixteen yards apart. They have been commonly regarded as the limits of a race-course, and as of British origin; but neither of these points is ascertained. There do not appear to be any remains of Venonæ, which probably stood at the intersection of Watling-Street and the Foss-Way; but Camden reports that great foundations of square stones had been discovered under ground, and, since his time, coins have been found here. There are some traces of Tripontium near Catthorpe. There are remains or traces of encampments, probably Roman, near Market Harborough; at Medbourne near Harborough; at Burrow near the Rutlandshire border, south of Melton Mowbray; and at Sexhill, or Segs-hill, north-west of the Melton Mowbray. Tessellated pavements have been found at Rothley and Wanlip, between Leicester and Loughborough. At Wanlip were found also coins and broken urns.

The Roman road Watling-Street forms the boundary between this county and Warwickshire from Tripontium, or Catthorpe, to the neighbourhood of Manduessedum (Manceter, near Atherstone). The Foss-Way, another antient road, which intersects Watling-Street at Venonæ (High Cross), runs in a direct line north-east to Ratæ (Leicester); and from thence north-north-east to Vernometum, near Willoughby, just within the border of Nottinghamshire. The Via Devana enters the county on the south-east, crossing the Welland near Medbourne, and runs north-west by Ratæ (Leicester) and Ashby into Derbyshire. Some remains of the Foss-Way and Via Devana may be traced. Another antient road, the Salt-Way, is represented in some maps as branching from the Foss-Way near Sexhill, and running toward Grantham.

During the Heptarchy, Leicestershire was included in the kingdom of Mercia. In the year 680, or according to others 737, Leicester was made the seat of a bishopric transferred thither from Sidnaceaster. The diocese of Leicester, we may presume, was nearly coincident with the present county and archdeaconry of Leicester. About the year 970, according to some, the diocese was united to Lincoln; but others consider that it did not exist above a century from its establishment, being transferred to Dorchester on the bank of the Thames, in Oxfordshire; or rather united to the previously existing see of Dorchester.

By the treaty between Alfred and Guthrun the Dane, (A.D. 878 or 880) Leicestershire was included in the Dane-lagh, or Danish territory; and Leicester became one of the great Danish burghs. It was recovered by Ethelfleda, governess of Mercia, during the reign of Edward the Elder.

According to Throsby and others, Leicester had been the seat of an earldom under the kings of Mercia, A.D. 716; but Mr. Allen, in the Appendix to Sir F. Palgrave's 'Rise and Progress of the English Commonwealth,' gives to the nobles whom Throsby enumerates as earls of Leicester, the title of earls of Chester and Coventry. At a later period, A.D. 1018-1057, Leicestershire may have been included in the earldom of Mercia.

Upon the Norman Conquest, Leicestershire was divided between the followers and relatives of the Conqueror. Several of these or their descendants, to secure the territory thus acquired, erected castles or repaired older ones at Leicester, Mount Sorrel, Shilton, Whitwick, Groby, Hinckley, Donnington, Melton Mowbray, Ravenston, Thorpe, Sauvey, and Belvoir. Of these castles, except that at Ashby [ASHBY-DE-LA-ZOUCH], there are few remains. The present Belvoir Castle is a more modern edifice, erected or restored by the first earl of Rutland, in the end of the fifteenth or beginning of the sixteenth century, after the older edifice had been dismantled and ruined by Lord Hastings in the time of the war of the Roses. Leicester, Mount Sorrel, and Hinckley have been mentioned elsewhere. Of Groby (near Leicester) the earthworks and a few fragments of the masonry remain. There were several monastic establishments in the county, but there are no remains of any of these deserving notice. Leicester Abbey has been already mentioned.

The population of the county at the time of the Domesday Survey has been calculated by Nichols at 34,000.

Upon the accession of William Rufus, A.D. 1187, Leicestershire was ravaged by Hugh Grentemaisnell, who supported the cause of Robert, duke of Normandie. It was on this occasion that Leicester Castle was taken by William Rufus. The county was again the scene of contest in the civil troubles of the reigns of John and Henry III. The civil war of the Roses was closed by the defeat and death of Richard III. at Bosworth-field in this county, A.D. 1485. [BOSWORTH.]

In the civil war of Charles I. the men of Leicestershire seem generally to have taken the side of the parliament. The royalists, who had occupied Belvoir Castle, defeated a body of parliamentary forces, November 27, 1643, at Melton Mowbray, but in December of the same year the parliamentarians, under Lord Grey and Colonel Temple, gained an advantage over the royalists under Colonel Lucas at Belvoir. The royalists seem to have been in considerable strength in the neighbourhood of Melton, where in February, 1644, there was another skirmish. In March, 1644, Colonel Hastings, a royalist, took possession of Hinckley, where he collected some prisoners and booty, but these were rescued, and the royalists defeated, by a parliamentary detachment from Leicester. About the same time the royalists were defeated in a skirmish at Loughborough. Ashby and Belvoir appear to have been their strongholds: while the parliamentarians occupied Leicester, where their directing committee sat; they established several posts, one at Cole Orton, to watch the royalists at Ashby. In February, 1645, two skirmishes were fought, one between Harborough and Leicester, the other near Melton. In the first the royalists had the advantage and occupied Leicester for a night; the second was drawn. In these actions each party lost 300 to 400 men killed and wounded. On the 31st May, the king took Leicester by storm; the garrison consisted of about 450 soldiers and 500 to 600 townsmen; the resistance was obstinate, but unavailing: some of the women are said to have assisted in the defence of the breach. The besieging army was estimated at 4000. The triumph of the king was short· the battle of Naseby in Northamptonshire, near Market Harborough, was won by the parliament, a fortnight after the capture of Leicester: this victory was decisive. Leicester was retaken four days after by the parliamentarians. In his subsequent marches the king came once or twice to Belvoir and Ashby. Belvoir was taken by storm in November, the same year, and the garrison at Ashby surrendered in the Februrary following.

(Nichols's *History of Leicestershire; Beauties of England and Wales;* Conybeare and Phillips's *Outlines of the Geology of England;* Priestley's *History of Navigable Rivers; Parliamentary Papers.*)

Statistics.

Population.—Leicestershire is partly an agricultural and partly a manufacturing county. It ranks the 29th on the list of agricultural counties, and in this respect retains nearly the same position as it did in 1811 and 1821, when it was the 30th on the list. Of 49,812 males, of the age of 20 and upwards, living in this county in 1831, there were 15,343 engaged in agricultural pursuits, 10,542 of whom were labourers; 12,240 employed in manufactures, or in making manufacturing machinery; and 3701 employed as labourers in labour not agricultural. Of those engaged in manufactures 10,000 were employed in the manufacture of stockings. The town of Leicester contained 3400 manufacturers, of whom probably 3000 were stocking-makers. Loughborough contained 900, Hinckley 700, Sheepshead 500, stocking-makers; Great Wigston and Earl Shilton about 280 each; Fileby 200; Southfield, Burbage, Thurmastown, Kegworth, Barwell, Anstey, Whitwick, Blaby, Mount Sorrel, Oadby, contain from 180 to 130 each. After these in order may be reckoned Countessthorpe, Cosby, Whitstone, Enderby, Narborough, Sapcote, Long Stratton, Syston, as containing above 100 each. Less than 100, but more than 50, in each of the towns of Desford, Belgrave, Woodhouse, Gilmorton, Thungston, Great Glenn, Quorndon, Stoke-Golding, Lutterworth, Wykin, Smeeton, and Westerby. About 750 men are employed in lace-making, most of them probably at Leicester, several at Melton Mowbray and Quorndon. Frame-smiths and makers of machinery are of course frequent in all those places. In the county are mentioned about 40 weavers of linen and 40 carpet-makers.

The following Table is a Summary of the Population, &c., of every Hundred, &c., as taken in 1831.

HUNDREDS AND TOWNS.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
Framland . . Hundred	3,300	3,556	10	66	1,917	984	655	8,538	8,659	17,197	4,300
Gartree	3,634	3,803	10	151	1,605	1,318	880	8,331	8,728	17,059	4,436
Goscote, East .. .	3,830	4,033	11	142	1,783	1,629	621	9,343	9,427	18,770	4,763
Goscote, West .. .	9,442	9,727	58	393	2,474	5,542	1,711	23,572	23,740	47,312	11,756
Guthlaxton	4,734	4,867	9	205	1,524	2,720	623	11,251	11,340	22,591	5,692
Sparkenhoe	7,066	7,461	21	284	2,770	3,840	851	17,563	17,607	35,170	8,835
Leicester, Borough .	8,348	8,695	55	600	279	6,951	1,465	18,958	19,946	38,904	10,030
Totals .	40,354	42,142	174	1,841	12,352	22,984	6,806	97,556	99,447	197,003	49,812

The population of Leicestershire at each of the following periods was as under:—

	Males.	Females.	Total.	Increase per cent.
1801	63,943	66,138	130,081	..
1811	73,366	77,053	150,419	15·63
1821	86,390	88,181	174,571	16·05
1831	97,556	99,447	197,003	12·84

showing an increase between the first and last periods of 66,922, or nearly 51½ per cent., which is 5¼ per cent. below the whole rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

		£.		s.	d.	
1801	were	79,911,	being	12	3	for each inhabitant.
1811	..	110,560	„	14	8	„
1821	..	124,244	„	14	2	„
1831	..	113,951	„	11	6	„

The expenditure for the same purpose in the year ending March, 1837, was 55,019*l.* Assuming the population to have increased since 1831 in the same proportion as in the ten preceding years, the above sum gives an average of about 5*s.* 3*d.* for each inhabitant. All these averages, except the last, are above those for the whole of England and Wales, which for 1837 was 5*s.* 5*d.* for each inhabitant.

The sums raised in Leicestershire for poor-rate, county-rate, and other local purposes, in the year ending 25th March, 1833, was 139,303*l.* 6*s.*, and was levied upon the various descriptions of property as follows:—

	£	s.
On land . .	£108,330	3
Dwelling-houses .	29,551	"
Mills, factories, &c. .	783	2
Manorial profits, navigation, &c.	638	14
	139,303	6

The amount expended was—

	£	s.
For the relief of the poor . .	£114,881	16
In suits of law, removal of paupers, &c.	4,912	6
For other purposes . .	22,842	12
	142,636	14

In the returns made up for the subsequent years the descriptions of property assessed are not specified. In the four years ending March, 1837, the total money levied was in 1834, 133,812*l.*; 1835, 116,083*l.*; 1836, 97,019*l.*; 1837, 63,767*l.* and the expenditure for each year was as follows:—

	1834. £	s.	1835. £	s.	1836. £.	s	1837. £.
For the relief of the poor .	100,857	0	83,986	0	70 077	0	55,019
In suits of law, removals, &c.	5,472	0	3,808	0	3771	0	2,338
Payments towards the county-rate . .	28,502	0	16,884	0	15 761	0	..
For all other purposes			12,091	0	10,514	0	6,410
Total money expended	£134,831	0	116,769	0	100,123	0	63,767

The saving effected in the whole sum expended in 1837, as compared with that expended in 1834, was therefore about 52¾ per cent.; and the saving effected, comparing the same periods of time, in the expenditure of the poor, was nearly 45½ per cent.

The number of turnpike trusts in Leicestershire, as ascertained in 1835, is 24; the number of miles of road under their charge is 445. The annual income and expenditure in 1835 were as follows:—

	£	s.	d.
Revenue received from tolls .	£23,876	6	0
Parish composition in lieu of statute duty . . .	2,133	2	0
Estimated value of statute duty performed . . .	2,627	3	0
Revenue from fines . .		12	0
Revenue from incidental receipts	134	19	0
Amount of money borrowed on the security of the tolls . .	400	0	0
Total income	29,172	2	0

	£.	s.	d.
Manual labour . .	7,508	18	0
Team labour and carriage of materials	1,095	6	0
Materials for surface repairs .	5,792	8	0
Land purchased . .	239	12	0
Damages done in obtaining materials	270	18	0
Tradesmen's bills . .	1,929	15	0
Salary of treasurer . .	54	0	0
„ of clerk . .	329	0	0
„ of surveyor . .	1,087	15	0
Law charges . . .	874	14	0
Interest of debt . .	4,158	5	0
Improvements . . .	4,757	0	0
Debts paid off . . .	283	6	0
Incidental expenses . .	821	10	0
Estimated value of statute duty performed . . .	2,627	3	0
Total expenditure	31,838	10	0

The county expenditure in 1834, exclusive of that for the relief of the poor, was 15,181*l.* 9*s.* 11*d.*, disbursed as follows:—

	£	*s.*	*d.*
Bridges, building and repairs, &c.	351	14	2
Gaols, houses of correction, and maintaining prisoners, &c.	3,502	11	8
Shire-halls and courts of justice, building, repairing, &c.	66	10	8
Prosecutions	2,312	0	6
Clerk of the peace	253	10	8
Conveyance of prisoners before trial	335	19	8
Conveyance of transports	134	7	0
Vagrants, apprehending and conveying	35	19	7
Constables, high and special	568	3	9
Coroner	157	0	9
Debt, payment of, principal and interest	5,441	5	0
Miscellaneous	2,022	6	6

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 944, 1273, and 1667 respectively; making an average of 135 annually in the first period, of 182 in the second period, and of 238 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect of whom any costs were paid out of the county-rate, was 65, 93, and 93 respectively.

Among the persons so charged with offences there were committed for

	1831.	1832.	1833.
Felonies	73	84	89
Misdemeanors	21	11	10

The total number of committals in each of the same years was 97, 110, and 108 respectively.

	1831.	1832.	1833.
Convicted	65	83	77
Acquitted	19	17	22
Discharged by proclamation	12	22	13

At the assizes and sessions in 1837 there were 432 persons charged with criminal offences in this county. Of these 31 were charged with offences against the person, 20 of which were for common assaults; 29 persons were charged with offences against property committed with violence, 314 with offences against property committed without violence; 7 for malicious offences against property; 4 for uttering counterfeit coin; 5 for poaching; 6 for taking and destroying fish in enclosed waters; and 36 for riot, &c. Of the whole number committed, 328 were convicted, 71 were acquitted, and against 33 there was no bill found, or there was no prosecution. Of the whole number of persons convicted, 17 were sentenced to death, but none were executed; their sentences being commuted to transportation for various periods; 10 were sentenced to transportation for life, and 44 for various periods; 11 were sentenced to imprisonment for 2 years, or not less than 1 year; 24 for 1 year or not less than six months, and 198 for 6 months or under; 24 were whipped, fined, or discharged upon sureties. Of the whole number of offenders, 375 were males and 57 were females; 113 could neither read nor write; 211 could read and write imperfectly; 105 could read and write well; and the degree of instruction of the remaining 3 could not be ascertained.

The number of persons qualified to vote for the county members of Leicestershire is 8879, being about 1 in 22 of the whole population, and about 1 in 5 of the male population twenty years of age and upwards, as taken in 1831. The expenses of the last election of county members to parliament were, to the inhabitants of the county, 229*l.* 5*s.* 4*d.*, and were paid out of the general county rate.

This county contains 5 savings' banks; the number of depositors and amount of deposits on the 20th of November, in each of the following years, were as under:—

	1832.	1833.	1834.	1835.	1836.	1837.
Number of Depositors	2,714	3,321	3,232	3,356	3,778	3,878
Amount of Deposits	£79,210	£94,968	£93,761	£99,116	£108,092	£111,165

The various sums placed in the savings' banks in 1835, 1836, and 1837, were distributed as under:—

	1835.		1836.		1837.	
	Depositors.	Deposits.	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	1,813	£14,895	2,021	£15,958	2,095	£16,798
" 50	962	29,326	1,134	34,071	1,137	34,187
" 100	393	26,964	421	29,014	432	29,569
" 150	115	13,835	125	14,590	145	17,240
" 200	54	9,228	60	10,047	54	9,251
Above 200	19	4,868	17	4,412	15	4,120

Education.—The following summary is taken from the Parliamentary Returns on Education made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	116		
Number of infants at such schools; ages from 2 to 7 years:—			
Males		749	
Females		689	
Sex not specified		1,296	
			2,734
Daily schools	557		
Number of children at such schools; ages from 4 to 14 years:—			
Males		8,417	
Females		5,539	
Sex not specified		2,577	
			16,533
Schools	673		
Total of children under daily instruction			19,267
Sunday schools	399		
Number of children at such schools; ages from 4 to 15 years:—			
Males		13,389	
Females		13,586	
Sex not specified		4,225	
			31,200

If we assume that the population between the ages of 2 and 15 has increased since 1831 in the same proportion as the whole population has increased during the ten years preceding that period, we find that the number of children between the ages of two and fifteen residing in Leicestershire in 1834 was 50,467. Twenty-nine Sunday-schools are returned from various places where no other school exists, and the children, 1269 in number, who are instructed therein cannot be supposed to attend any other school. At all other places Sunday-school children have an opportunity of resorting to other schools also; but in what number, or in what proportion duplicate entry of the same children is thus produced, must remain uncertain. Thirty-one schools, containing 1805 children, which are both daily and Sunday schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. Allowing for this duplicate entry it may perhaps approximate to the truth to state that not more than two-thirds of the population between the ages of two and fifteen were receiving instruction in this county at the period this return was made.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	..	..	5	219	105	1,805	6	710
Daily Schools	76	3,041	46	2,408	410	9,603	25	1,481
Sunday Schools	13	620	373	29,658	..	..	13	922
Total....	89	3,661	424	32,285	515	11,408	44	3,113

The schools established by Dissenters, included in the above statement, are—

	Schools.	Scholars.
Infant schools	—	—
Daily schools	5	283
Sunday-schools	149	14,926

The schools established since 1818 are—

		Scholars.
Infant and other daily schools	347, containing	10,834
Sunday-schools	217	21,100

Eighteen boarding-schools are included in the number of daily schools given above. No school in the county of

Leicester appears to be confined to the children of parents of the Established church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by dissenters, with whom are here included Wesleyan Methodists, together with schools for children of Roman Catholic parents.

There are lending libraries of books attached to 33 schools in this county.

LEIGHLIN, a bishop's see in the archiepiscopal province of Dublin, in Ireland. This diocese comprehends the county of Carlow, and extends into the counties of Wicklow, Wexford, Queen's County, and Kilkenny. The chapter consists of a dean, precentor, chancellor, treasurer, archdeacon, and four prebendaries. In 1792 it was divided into 89 parishes, constituting 39 benefices, and having 30 churches. In 1834 the numbers were—parishes 82, benefices 56, churches of the Establishment 49, places of Roman Catholic worship 64. In the latter year the gross population of the diocese was 190,852, of whom there were 20,391 members of the Established Church, 169,982 Roman Catholics, 191 Presbyterians, and 288 other Protestant Dissenters; being in the proportion of somewhat more than eight Roman Catholics to one Protestant. In the same year there were in the diocese 279 daily-schools educating 20,755 young persons, being in the proportion of 10·87 per cent. of the entire population under daily instruction, in which respect Leighlin ranks first among the 32 dioceses of Ireland. Of the above schools, in 1834, 61 were in connection with the National Board of Education.

The founder of this diocese was St. Laserian, who supported the Roman mode of celebrating Easter at the Synod of Whitefield, or Leighlin, A.D. 630. Prior to that time the church of Leighlin had been ruled by an abbot. It is said, that during Laserian's time he had 1500 monks under his government in this abbey. The names of his successors down to the period of the arrival of the English are not known. The first Protestant bishop was Robert Travers, advanced to the see A.D. 1550, and deprived, on the accession of Queen Mary, soon after. He was succeeded by Thomas Field, a Franciscan friar, who in 1567 was succeeded by Daniel Cavanagh, the second bishop of the Reformed faith. The bishoprics of Leighlin and Ferns became united A.D. 1600, in the person of Dr. Robert Grave, which union still subsists. The lands of the see comprise 12,924 statute acres, producing an annual average income of 2667*l.* 7*s.* 6¾*d.* The cathedral is the parish church of Leighlin-Bridge. According to the provisions of the 3rd and 4th William IV., c. 37, the see of Ossory, on its falling vacant, becomes united with the united sees of Ferns and Leighlin.

(Beaufort's *Memoir of a Map of Ireland;* Harris's *Ware's Bishops of Ireland; Parliamentary Returns,* &c.)

LEIGHTON, ROBERT, D.D., archbishop of Glasgow; a divine whose sermons and other tracts are held by many persons in great esteem, but who has secured for himself a reputation by having acted in a manner the most opposite to that by which reputation is most commonly secured. In times of excitement he was the steady advocate of peace and forbearance. One story of him so completely illustrates his character, that, though it has been often told, we must repeat it. A question not unfrequently put to the Scottish clergy at their assemblies was, 'Whether they preached to the times?' When Leighton's turn came, his reply was, 'When all my brethren preach to the times, suffer me to preach about eternity.'

The times spoken of are those of the Commonwealth, or a little before, when he had a church near Edinburgh; but he found that moderation would not be tolerated in a minister, so that he retired into privacy, from whence however he was called to preside over the university of Edinburgh. When Charles II. resolved to make the attempt at introducing Episcopacy into Scotland, Dr. Leighton was nominated to the bishopric of Dumblane. His conduct was the reverse of that of Dr. Sharpe, who was ostentatious in the display of an ecclesiastical rank which was displeasing to a large portion of the Scotch nation. Leighton on the contrary conducted himself with that moderation which he had before manifested, so that he won the affections of even the most rigid Presbyterians. The bishops generally took a different course, and this induced Leighton to offer to resign his bishopric: but the views of the Court changing in respect of the attempt to bring the Scotch nation to accept an Episcopalian church, and it being intended to proceed more in the way of persuasiveness and gentleness, he was induced to accept the archbishopric of Glasgow. Still he found it an affair of contention little suited to his habits or turn of mind, and accordingly he resigned his archbishopric, and retired to the county of Sussex in England, where he ended his days in 1684. The best edition of his works, with an account of his life, was published in 1808, 6 vols. 8vo.

LEIGHTON BUZZARD, a parish and market-town in the hundred of Manshead and county of Bedford, is seated on the right bank of the Ouse, 17 miles west-south-west from Bedford, and 38 north-west from London, near the line of the London and Birmingham Railway. The streets are ill-paved and not lighted with gas, and the inhabitants derive their chief supply of water from wells. The trade consists in corn and timber: the market-day is Thursday, and the fairs are held in February, April, July, October, and December. The living, in the diocese of Lincoln, is a vicarage in the patronage of the prebendary of that see. Its net annual value is 193*l.* The burgh and parish, including the four chapelries of Billington, Egginton, Heath-and-Reach, and Standbridge, contained, in 1831, a population of 5149 persons, that of the burgh alone being 3330. Besides a Lancasterian school for the education of children of both sexes, and supported by voluntary contributions, there are several benevolent institutions and charitable foundations, a particular account of which is given in the Twelfth Report of the Commissioners on Charities. The principal of these are the almshouses, originally founded by Edward Wilkes in 1630, which, together with certain revenues bequeathed by him and his successors, are appropriated to the use, maintenance, and clothing of poor widows of the town of Leighton Buzzard, and the Pulford and Leigh charities for affording gratuitous instruction to poor children resident in the same town. (*Parliamentary Papers,* &c.)

LEININGEN, formerly a county situated between the Lower Palatinate and the bishoprics of Spires and Worms, gives its name to one of the wealthiest of the mediatised German houses. The antient line of princes becoming extinct in 1220, Frederick of Hardenberg, son of Simon, count of Saarbrück, and of Luccarde, daughter of the last count of Leiningen, succeeded to the territory by inheritance, and assumed the title of count of Leiningen. The family was subsequently divided into several branches. The principal line obtained, in 1779, the dignity of princes of the empire: in 1803 it lost its possessions on the left bank of the Rhine, which had an area of 250 square miles, with 36,000 inhabitants, and produced a revenue of 168,000 florins, and obtained instead Amorbach, Miltenberg, and several other bailliwicks, the area of which is 520 square miles, with 86,000 inhabitants, in 15 towns, 9 market villages, and 171 other villages, producing a revenue of 568,000 florins, which form together the present principality of Leiningen. The principality was mediatised (as it was called) by the act of the Rhenish Confederation in 1806; and, according to the territorial arrangements made in 1810, 410 square miles are under Baden, 100 under Bavaria, and 10 under Hesse-Darmstadt. The population of the principality is now about 107,000. The present Prince Charles, born at Amorbach in 1804, succeeded his father in 1814, under the guardianship of his mother, Maria Louisa Victoria, a princess of Saxe-Coburg, sister to Leopold, king of the Belgians; she is the widow of the late duke of Kent, and mother of Victoria, queen of the United Kingdom. The prince's residence is at Amorbach, in the Odenwalde, which has a population of about 3000 inhabitants. It has some manufactures, a new palace, with fine gardens, and a very handsome church with four towers and a remarkable organ. The religion is Protestant. There are four other branches of the house of Leiningen, two Protestant and two Roman Catholic; but all of them have much smaller possessions than the above principal branch.

LEINSTER, a province of Ireland, supposed to be derived from the Irish *laighen,* signifying a spear. It extends from 52° 6′ to 54° 7′ N. lat., and from 6° to 8° 3′ W. long., including the eastern half of the central and south-eastern parts of Ireland. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge it comprises 4,356,868 statute acres, or 6807½ square statute miles.

Of the four provinces of Ireland, Leinster possesses the greatest advantages in point of soil and surface, being little encumbered with mountains, and having consequently superior facilities for internal communication. The navi-

gable Shannon forms part of its western boundary, and the navigable Barrow intersects its central and southern counties. The Boyne also, the basin of which lies within its north-eastern limits, is partly navigable, and two canals traverse it from east to west. The coast is inferior in point of natural harbours to that of the remainder of the island, but it is more sheltered from the prevalent winds.

Upon the coming of the English in 1170 the present province was divided into the two petty kingdoms of Meath and Leinster, and embraced also a part of the then kingdom of Ulster, in the present county of Louth. The first counties erected were those of Dublin, including the present county of Wicklow; Meath, including the present West Meath and Longford; Louth; Kildare, including the present King's and Queen's Counties; Carlow, Kilkenny, and Wexford. Meath was divided into Meath and West Meath in the reign of Henry VIII.; King's and Queen's Counties were separated from Kildare and erected into separate counties in that of Mary; Longford was made shire-ground in the time of Elizabeth; and Wicklow was finally separated from Dublin and made a county in the reign of James I.

The antient kingdom of Leinster, including all the counties south of Meath, with the exception of Dublin, was inherited by the descendants of Eva, daughter of Dermod MacMurrogh, and wife of Earl Strongbow. Meath was bestowed on Hugh de Lacey, and descended to the families of De Verdon and Geneville. Almost all the inheritors having ultimately become absentees, the native Irish of Carlow, King's and Queen's Counties, and West Meath seized on their estates, and obliterated all traces of the English law from the western and some of the midland parts of the province; nor was it till the reign of Elizabeth that the whole was brought again under a regular government. The counties of Louth, Meath, Dublin, Kildare, and Wexford have not shaken off the English law or abjured English manners at any time since the Conquest.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort . . .	181,948	..	..	..	..	..	..	..
1821	Under Act 55 Geo. III. c. 20 . .	278,398	352,320	..	..	..	859,798	897,699	1,757,492
1831	Under Act 1 William IV. c. 19 . .	292,729	344,314	186,177	75,040	83,097	927,877	981,836	1,909,713

The population of Leinster in the last year gives 373 inhabitants to the square mile, being a more dense population than in the other provinces.

LEIOCE'PHALUS. [IGUANIDÆ.]

LEIOLÆMUS. [IGUANIDÆ.]

LEIO'LEPIS. [AGAMA, vol. i., p. 192; IGUANIDÆ.]

LEIOSAURUS. [IGUANIDÆ.]

LEI'OTHRIX, a genus of birds established by Mr. Swainson, with the following

Generic Character.—Bill much compressed; *Culmen* gradually curved; *Nostrils* large, membranaceous; *Tail* moderate, deeply forked.

Example.—Leiothrix furcatus, 'Pl. Col.,' 287, f. 1: India. The genus belongs to Mr. Swainson's subfamily *Leiotrichanæ* (Silky Chatterers?), being the first of his family *Ampelidæ*. Fruit-eaters or Chatterers. [LEIOTRICHANÆ.]

LEIOTRICHA'NÆ, Sw. The subfamily alluded to under the title *Leiothrix*, and thus defined by Mr. Swainson:—

Legs large, robust, syndactyle. Hind-toe longer than the outer. Wings short and rounded. Bill strong; the gonys ascending.

The only other genus besides *Leiothrix* placed in this subfamily by Mr. Swainson is *Pteruthius*, Sw., to which that author gives the following

Generic Character.—Bill short, compressed, thick; the tip shrike-like, hooked; *culmen* arched; *gonys* ascending. *Nostrils* basal; the aperture round; *gape* wide; *rictus* slightly bristled. *Wings* very short, rounded. *Tail* short, broad, rounded; the tips obtuse. *Tarsi* smooth, pale. Example, *Pteruthius erythropterus*, Gould's 'Century of Himalaya Birds,' pl. 11, (*Lanius erythropterus*): India.

LEIPZIG, or LEIPSIC, one of the four circles of the kingdom of Saxony, is bounded on the west and north by Prussia, on the east by the circle of Meissen, and on the south by that of the Erzgebirge, and the principality of Saxe-Altenburg. Its area is 1326 square miles, and the population (according to the census of 1834) 361,251. The country is level, except in the south and south-east, where there are some offsets of the Erzgebirge. The soil is fertile and well cultivated: but the country is deficient in wood, which is procured from the Erzgebirge and the circle of Voigtland. There are no metals; but there are potters' clay, limestone, marble, porphyry, and jasper. There is a very good generally improved breed of sheep, of which the circle is estimated to possess about 300,000.

This is not one of the manufacturing circles of Saxony: there are however flourishing manufactures of woollens, cotton, and linen in all the thirty-eight towns; but in the villages, which are above 1000 in number, all hands, generally speaking, are required for agriculture. The climate is temperate and healthy.

LEIPZIG, the capital of the circle, and the second city in the kingdom, is in 51° 20′ 16″ N. lat. and in 12° 21′ 45″ E. long., in an extensive plain watered by the Pleisse, into which the White Elster, in several arms, the Parde, and the Luppe flow. The swamps that formerly existed in this plain having been filled and drained, it is now extremely fertile and healthy, and covered with flourishing villages. The town, including the four suburbs, is nearly a mile in length from north to south, parallel to the course of the Pleisse, and three-quarters of a mile in breadth. It contains about 1540 houses, of which 877 are within the walls, and 47,514 inhabitants (1837). It was formerly well fortified, but the ramparts have been converted into public walks, and partly laid out as gardens. The only remaining part of the fortifications is the castle, called the Pleissenburg, upon which the observatory now stands.

Leipzig is by no means regularly built, and the streets are generally narrow, though well paved and lighted, but it contains many very handsome parts, numerous elegant public buildings, private houses resembling palaces, and many seats, with fine gardens, in the suburbs. The most remarkable edifices are St. Thomas's Church; St. Nicholas, a venerable and magnificent building, adorned with paintings by Oeser; St. Paul's, or the University Church; St. John's, in which is the marble monument of Gellert; the theatre, the town-hall, built in 1599, the cloth-hall, the Pleissenburg, with the observatory, which is furnished with excellent instruments, and is in 51° 20′ 19″ N. lat. and 30° 1′ 52″ E. long. of Ferro, and 10° 1′ 45″ E. of Paris. The great building called Auerbach's House is in the time of the fairs a kind of bazaar, where the finest and most costly articles are exposed for sale. There are numerous excellent schools and academies, and many literary and learned societies, such as Prince Jablonowsky's Society for the cultivation of science, the Societies of Natural History and Mineralogy, that for the National Language and Antiquities, a deaf and dumb institution, an academy of design, painting, and architecture, many museums, several considerable private collections, especially of paintings, the library of the Senate, now consisting of 60,000 volumes and 2000 MSS., with a cabinet of 6000 coins and medals, and admirable establishments for the poor, which are considered to be some of the best in Germany. There are also flourishing manufactories of various kinds. Leipzig, though comparatively small,

has become one of the most important cities in Europe, owing to its university, its fairs, and its book-trade.

The university was founded in 1409, in consequence of the immigration of a great number of students from Prague with their professors, on which occasion the Elector Frederick and his brother William took the universities of Prague and Paris as models. The 4th December, 1409, is considered as the date of the foundation, and the bull of Pope Alexander VI. confirming it is of the same year. The salaries of the professors were paid partly in money, and partly by the assignment of the rents of certain houses and lands. The revenues were increased by various additions in process of time; and lastly, the late king Frederick Augustus allotted to the purpose of paying the salaries of the professors, &c., the interest of 100,000 dollars and some other revenues. During its whole existence of more than four centuries, the university of Leipzig has enjoyed the reputation of being one of the most eminent in Germany. The number of students is between 1100 and 1200, and that of the professors ordinary and extraordinary, lecturers, private teachers, &c., 120. The organization of the university has been frequently modified, and especially since 1830, when the four nations of which it was composed were abolished, and the general administration of the university placed under the department of ecclesiastical affairs: the property of the university, with the immediate superintendence of the management, was confirmed to it. For the promotion of the studies in the university there are admirably organized institutions, some of them founded by bequests and donations, partly designed for the cultivation of learning in general, and partly for particular branches of science. Among them are the philological seminary, an excellent clinical institution, a school of midwifery, a botanic garden, a chemical laboratory, an ophthalmic institution, a deaf and dumb asylum, a museum of natural history, &c. The library, after having been for a long time rather neglected, has now an additional head librarian under the minister for ecclesiastical affairs: it was formed out of the libraries of suppressed monasteries and the gifts of professors, and now consists of 100,000 volumes and above 4000 MSS., and is particularly rich in philology, medicine, and old divinity. A great ornament of the university is the Augusteum, erected by a grant of the Assembly of the Estates in 1831, in memory of King Frederick Augustus, and finished in 1835. It is a very fine building, after a design of Schinkel, 300 feet in length and three stories in height, and contains a great hall, lecture-rooms, and apartments for the library, the cabinet of philosophical apparatus, and the collections of natural history. The university still retains its reputation for sound learning, and the students, notwithstanding the excitement of recent times, deserve the praise of diligence and good conduct. (Gretschel, *Die Universität Leipzig*, Dresden, 1830.)

The origin of Leipzig was the Slavonian village in the angle where the Parde falls into the Pleisse, which is said to have received its name from the lime-trees growing about it, which are called in Slavonian Lip, Lipa, or Lipsk. After King Henry I. had founded the castle of Meissen in 928, he seems to have laid the foundations of a castle in the plain of Leipzig; but it is not spoken of as a fortified town, surrounded with walls and a moat, till the twelfth century, under Margrave Otho the Rich, who granted it a licence to hold two fairs, at Easter and Michaelmas. At that time the number of the inhabitants was between 5000 and 6000. Otho's son Dietrich designed to curb the mutinous spirit of the citizens by erecting in 1218 three castles, of which only the Pleissenburg still exists, but in a very different form. As Jews are already mentioned at that time among the inhabitants, it may be inferred that there was considerable trade. The first fair at New Year was proclaimed in 1458, and the three fairs were confirmed by the emperor in 1507. These fairs have laid the foundation of the prosperity and wealth of Leipzig. The concourse of merchants from various countries is very great, and the value of the goods sold was estimated a few years ago at upwards of three millions sterling, not including the value of the books. The business done at the fairs is not so great as it has been, which is owing in a great measure to the very rigorous prohibitory system of Russia, which, being extended to the kingdom of Poland and the provinces of Persia and Asiatic Turkey now incorporated with the Russian empire, prevents the merchants of those countries from making extensive purchases at Leipzig. What effect the formation of the German Commercial League may have on the trade of Leipzig cannot yet be fully ascertained; but it seems to be now believed that it will be rather favourable than otherwise.

The singular concentration of the German book-trade in Leipzig has been a main cause of the celebrity and wealth of that city. The first two booksellers, who were also printers, that settled in Leipzig were Steiger and Boskopf, in 1545. The books were sent to Frankfort fair for sale; but subsequently the book fair at Leipzig was instituted, and in 1667 it was attended by nineteen booksellers from other places. The first catalogue appeared in the sixteenth century. The systematic arrangement of the catalogue was changed in process of time for the alphabetical, and in 1795 the size was altered from quarto to octavo. The number of new works announced has gradually increased. It was not till 1816 that above 3000 new works appeared in Germany; in 1828 there were above 5600; and this year, 1838, about 6000. The German booksellers are either publishers (Verlagshändler) who sell only their own publications, or booksellers who publish nothing themselves (Sortiments händler), but sell only what they purchase of the publishers. Now however these latter are in general publishers also, by which means they are able to make exchanges with other publishers. It is now become the general custom for the publishers to let the retail booksellers have their publications on sale and return for a certain time, at the expiration of which payment is made for what has been sold, and the remainder may be returned. The peculiar feature in the German book-trade is that every publisher has his commissioner at Leipzig, to whom he sends prospectuses and specimens of his new publications, which the commissioner distributes and makes known. A bookseller out of Leipzig, A, sends his orders, not to the publisher, B, but to his own commissioner, C, at Leipzig, who delivers them to the commissioner of the publisher, D, and the latter gives the books to C, and keeps the order to send to B.

At the Easter fair booksellers from all Germany, Sweden, Denmark, the Russian Baltic provinces (where the German language is spoken), from the Netherlands, and even France and England, to the number of above 300, meet at Leipzig to settle their accounts, &c.; and this meeting has acquired additional importance by the establishment of a Booksellers' Exchange, a handsome building which has been but just completed. The number of booksellers and music-sellers in Leipzig itself is 119. Besides the advantages arising from this centralization of the book-trade, the 23 printing-offices, of which that of Brockhaus, in which the 'Conversations Lexicon' is printed, employs 40 ordinary presses, and three machines which are worked by a steam-engine, and the five type-founderies, employ a capital of some millions of dollars. Above 40 millions of sheets are annually printed at Leipzig, and the bales of books brought thither every year amount on an average to 30,000 cwt., the value of which however is probably not more than from 200,000*l.* to 250,000*l.* sterling.

Much as Leipzig has suffered at different periods by the miseries of war, the active spirit of the citizens has always enabled them to recover in a much shorter time than might have been expected. The Thirty Years' War seemed to have wholly ruined it. In September, 1631, the great victory obtained by Gustavus Adolphus over Tilly was fought on its plain; and in 1642 it was besieged by the Swedish General Torstenson, after defeating the Imperial army under the Archduke Leopold William and Piccolomini, who came to its relief. The fearful conflict on the 16th, 17th, and 18th of October, 1813, in which Napoleon was totally defeated by the allied armies under Prince Schwarzenberg, is still fresh in our recollection. The damage done in the environs only of Leipzig was estimated at 2,580,949 dollars (400,000*l.*), and yet in a few years all trace of the mischief had disappeared. The pursuit and the acquisition of wealth have not obscured the good qualities which Pope Alexander VI. recognised in the inhabitants when he declared them to be polished and well-conducted persons. They have given every encouragement to education and the cultivation of knowledge. Men of eminence, such as Gesner, Ernesti, Fischer, Reiske, have been rectors of the schools; and Leibnitz, Thomasius, Fabricius, and Teller were natives of this city. They are great friends to the fine arts, and are especially fond of music and the drama, and the best actors of Germany have been formed on their stage. They are also extremely charitable, and are ready to relieve by liberal contributions cases of distress, either among themselves or in other parts of Germany

(Leonhardi's *Geschichte und Beschreibung der Kreisstadt Leipzig*, Leipzig, 1799; Dolz's *Versuch einer Geschichte von Leipzig*, Leipzig, 1818; and Gretschel, *Leipzig und seine Umgebungen*, Leipzig, 1828.)

LEITH, a seaport town and contributory parliamentary borough, situated on the banks of the river Leith, at its confluence with the Frith of Forth, is about two miles north-east from the city of Edinburgh, with which it is connected by a broad street called Leith Walk. It is irregularly built and ill-paved, but contains many handsome houses of recent erection. There are several churches and other public buildings, of which it is sufficient to mention the custom-house, mariners' hospital, assembly-rooms, and the elegant bathing establishment at Seafield. A gaol was erected in 1822, at the expense of the corporation of Edinburgh; but in consequence of disputes between that body and the community of Leith, no use is at present made of the building, although the common lock-up house is said, from dampness and other defects, to endanger the lives of the prisoners. The municipal government of the town is conformable to the act 3 and 4 William IV., c. 66 and 77, according to which the governing body consists of a provost, four baillies, a treasurer, and ten common-councillors. The principal incorporated trades are the 'Ship-masters,' usually termed the 'Trinity House;' the 'Traffickers,' or 'Merchants' Company;' the 'Maltmen,' and the 'Trades,' the last of which possesses certain exclusive privileges. The police of the town is under the regulations of a local act of 7 and 8 Geo. IV., cap. 112, entitled 'An act to provide for the municipal government of the town and suburbs of Leith, for the further administration of justice, and for the regulation of the police therein;' and the expense of the establishment, together with the expense of lighting and cleansing, is defrayed by an assessment of 1*s.* 6*d.* in the pound upon the rent of all lands and houses whose yearly rent is not less than 3*l.*

In consequence of the close connection which has been established from a remote period between Edinburgh and Leith by means of the charters granted by different monarchs to the former town, the revenues of Leith, including the port dues, and likewise the imposts levied within the burgh, have hitherto (1836) formed part of the revenue of Edinburgh; and the debts, with some trifling exceptions, are placed in the same position. Among the debts for which the corporation of Edinburgh are responsible, the most important are those contracted with the government for the purpose of constructing the Leith Docks, and which, in the year 1835, amounted to 245,992*l.* The capital, belonging exclusively to the corporation of Leith, consists of public buildings and debts due from the trustees of the new markets, and was estimated, in 1833, at 5824*l.*, from which had to be deducted engagements amounting to 3818*l.* The annual income of the corporation at the same period was 196*l.*, and its expenditure 35*l.*

There are two commodious dry docks for the repairing and building of ships, and two wet docks (one opened in 1806, the other in 1817), each of which is 300 feet wide and between 700 and 800 feet long, and of sufficient depth to admit vessels of from 200 to 250 tons burthen. They are surrounded by well-constructed quays, upon which are erected appropriate warehouses for the reception of merchandise. The depth of water in the harbour during neap-tides is about 10 feet, and during spring-tides about 16 feet. A steam-vessel belonging to the London Shipping Company leaves St. Katharine's wharf, London, for Leith, every Wednesday and Saturday evening. Great complaints have been made against the corporation of Edinburgh for 'unjustifiably' increasing the rate and number of the port charges, which is said to have been productive of considerable injury to the mercantile community of Leith, many branches of commerce which formerly flourished having been transferred in consequence to other ports. The net proceeds of the harbour and dock dues for the year ending Whit-Sunday, 1833, were 12,217*l.*, out of which the corporation of Edinburgh paid to government 10,350*l.* on account of interest and sinking fund.

The borough, in union with Portobello and Musselburgh, returns one member to parliament. It comprises the parishes of North and South Leith, whose population, in 1831, was 25,855 and 18,439 respectively. The population of the latter parish had decreased during the preceding ten years, in consequence of many of the inhabitants having removed from want of employment.

At the time of the foundation of the High School of Leith (the date of which does not appear) the endowments are stated to have been considerable; but in 1831 the funds were insufficient to liquidate the salaries of the teachers. In that year however the late Dr. Andrew Bell, by deed, appointed the magistrates and heads of the corporation trustees for certain sums (4894*l.* 3 per cent. consols, and 4895*l.* bank annuities), to be appropriated in the foundation of schools on the Madras system; and since then, although no new school has been established, two teachers, upon the above system, have been appointed to the High School by the corporation, by whom also they continue to be paid. The administration of the Bell trust funds is described as having been in several respects improvident and censurable. The management of the other affairs of the High School is confided to the Kirk Session and to the commissioners under the local act before cited. During the ten years preceding 1836 the number of pupils varied from 160 to 250. There are six classes, namely, two for the classics, one for the mathematics, one for writing and arithmetic, and two for English. The fees for the first two are 15*s.* per quarter, and for the other four 7*s.* 6*d.* per quarter. For more particular information as to the High School, the state of the harbour, and the connection between the city of Edinburgh and burgh of Leith, see the Commissioners' Reports on the city of Edinburgh (1835) and on the burgh of Leith (1836), from which this article is principally taken.

LEITMERITZ, one of the sixteen circles of the kingdom of Bohemia. It is bounded on the east by the circle of Buntzlau, on the south by that of Rakonitz, on the west by Meissen, and on the north by Lausitz. The area is 1434 square miles, and the population 345,000, who are mostly Germans. It contains 30 large towns and 967 villages. The greater part of this circle is high mountain land. On the north-west is the Erzgebirge, on the north and north-east the ridge of the Sudetes, and in the middle, between the Eger and Bela, a part of the Bohemian central chain. Some parts are mountainous and sterile, while others are romantically beautiful, with extensive valleys, which are among the most fertile parts of Bohemia, whence this circle is called the Bohemian Paradise, and the granary of Saxony. It produces in abundance corn, flax, hops, fruits, lime, tin, precious stones, especially garnets, coals, in the higher parts timber, and contains many stone-quarries. It possesses a good breed of cattle; and there are manufactures of woollen, cotton, and linen. The Elbe, flowing northwards, traverses the whole length of the circle. The other chief rivers are the Eger, the Bela, and the Potzen. The town of Töplitz, with its celebrated mineral springs, is in this circle. [TÖPLITZ.]

LEITMERITZ, the capital of the above circle, is situated in 50° 30′ N. lat. and 14° 5′ E. long., on the Elbe, which is there navigable, and over which there is a bridge 843 feet in length. It is surrounded with walls and a moat. It has a very fine cathedral, dedicated to St. Stephen, and eleven churches, the principal of which is All Saints, an episcopal palace, a handsome townhall, a gymnasium, a theological seminary, &c. The inhabitants, 4800 in number, have a few inconsiderable manufactures, and chiefly subsist by a profitable fishery of sturgeon, shad, and salmon, and the cultivation of their corn-fields, orchards, and vineyards.

(Hassel, *Geography*; Blumenbach, *Oesterreichische Monarchie*; *Oesterreichische National Encyclopédie*.)

LEITRIM, a maritime county of the province of Connaught in Ireland, bounded on the north by the bay of Donegal and by Donegal county, on the north-east by the county of Fermanagh, on the east by the county of Cavan, on the south-east and south by the county of Longford, and on the south-west and west by the counties of Roscommon and Sligo, from the former of which it is separated by the river Shannon. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge it lies between 53° 47′ and 54° 27′ N. lat., and between 7° 35′ and 8° 25′ W. long.; and according to the Ordnance Survey of Ireland, extends from north-north-west to south-south-east 51½ statute miles, varying in breadth from 5½ to 21. In the latter map the area is given as follows:—

	Stat. Acres.	R.	P.
Land	368,614	3	25
Water	23,747	3	37
Total	392,362	3	22

or 613 square statute miles. In 1831 the population was 141,524.

The outline of Leitrim is very irregular, being contracted in the centre to little more than the breadth of Loch Allen, north and south of which lake the county expands into its two principal divisions. The district lying south and east of Loch Allen is an irregular parallelogram of about 18 miles by 20, the western and south-western sides of which are formed by Loch Allen and the line of the Shannon, and the north-eastern and south-eastern sides by the boundaries of the counties of Cavan and Longford respectively. The southern portion of this district, abutting on the counties of Longford and Roscommon, is to a considerable extent encumbered with narrow and steep ridges of low elevation, running in a direction about 10° west of north and east of south, which is consequently the general direction of all the streams and roads by which the intermediate valleys are traversed. The numerous small lakes also abounding in this part of Leitrim are of conformable outline. Of these the principal is Rinn loch, about two miles in length by half a mile in breadth, formed by an expansion of the Rinn river, which runs southward out of Leitrim through the north-western extremity of Longford to the Shannon. The Eslin, which brings down the waters of several small lakes situated between the Rinn and the Shannon, joins the latter river at the southern extremity of Loch Boffin. The rough country above mentioned lies eastward from the Eslin towards the Longford boundary, along which it extends for a distance of ten miles, covering in all a tract of about 30 square miles. Northward from this tract extends an open undulating plain, interspersed with numerous lakes and streams as far as the southern extremity of Loch Allen. This district forms part of the great limestone plain of Ireland, and contains some patches of excellent arable land, but is in general more adapted for grazing. The surface is more irregular than is generally the case in other divisions of the limestone country, in consequence of the great number of clay and gravel ridges scattered over it. The general direction of these ridges conforms to that of the heights farther south, but they are not disposed with so much regularity. The principal heights in this part of the county are Sheemore and Sheebeg, two hills of moderate elevation rising from the eastern bank of the Shannon. The main drainage of the limestone district is southward and westward to the Shannon, but several considerable streams in the north-eastern division of it run eastward to the lakes on the border of Cavan. Of the latter the principal is the river Dale, which runs into Garadice lake, and thence to Loch Erne. A cluster of lakes, of which the largest are called Lough Scur and St. John's Lough, occupies a tract of about six miles in length on the north of this level district, and there are upwards of fifty other lakes, varying in size from a quarter of a mile to a mile in length, scattered throughout the same portion of the county. The principal towns and villages are situated on the borders of the plain, the interior being comparatively thinly inhabited. They are, on the western side, Drumshanbo, at the southern extremity of Loch Allen; Leitrim, a village, four miles farther down the Shannon; Carrick-on-Shannon, the county town, three miles south of Leitrim, situated at the point where the Shannon changes its southern for a south-eastern course; Jamestown, three miles south-east of Carrick-on-Shannon, and Drumsna, two miles farther down the river. Along the southern margin of the plain the towns are Mohill, north of Loch Rinn, Cloone, and Carrigallen, near the Cavan boundary. On the east is the village of Newton Gorie, and in the north the small town of Ballinamore, and the villages of Castlefore and Cashcarrigan, the two latter situated between Loch Scur and St. John's lough.

That part of the basin of Loch Allen which is included within this county is formed by the group of Slieve-an-ierin on the east, by the Lackagh range lying south of Manor Hamilton on the north, and by a part of the Munterkenny and Braulieve ranges on the west. The group of Slieve-an-ierin extends from above Drumshanbo into the west part of Cavan, a distance of about twelve miles. Its highest point is at its southern extremity, where it has an altitude of 1922 feet. The summits of Bencroy and Lugnacuillagh, which are the most prominent points within this county in the group farther north, rise to 1707 and 1494 feet respectively. Between the two latter mountains the Yellow river descends by a broad and precipitous channel to Loch Garadice, and the Shannon, which has its source in Cavan, enters the northern extremity of Loch Allen through the valley intervening between Lugnacuillagh and the eastern declivities of the Lackagh groups upon the north. The highest summit of the Lackagh range is 1448 feet, and between it and the Munterkenny group, which rise along the western shore of Loch Allen, a wide valley intervenes watered by the Diffagher. The Diffagher has its chief source in Belhavel lake, a sheet of water about two miles in length, which occupies the summit level between Loch Allen and the valley of the Bonnet; the waters to the north of this point finding their way to the Atlantic either by Sligo or the bay of Donegal, and those to the south descending to Loch Allen and the Shannon. The heights of Munterkenny, the highest point of which is 1377 feet, bound Loch Allen on the west, forming the northern side of the valley of the Arigna, which river for some distance constitutes the boundary between Leitrim and Roscommon [ROSCOMMON], and runs into the south-western extremity of Loch Allen through a portion of the latter county. Besides the rivers enumerated, Loch Allen receives the waters of numerous minor streams and winter torrents, particularly from the western side of Slieve-an-ierin, which is deeply furrowed with their channels. The lake is eight miles in length, and from one to three in breadth, and lies nearly north and south. The Shannon issues in a noble stream from its southern extremity, at which point the scenery is highly picturesque, as well as at the opposite end of the lake, where several islands and peninsulas diversify the outline. The general aspect of the lake however is gloomy, and from its situation it is exposed to violent squalls, which render navigation dangerous. Its summer level is 159 and its winter level 163 feet above the level of the sea at low water. The Shannon, in its passage from Loch Allen to the extremity of the county, has a fall of thirty feet, which is principally distributed over the first seven miles of its course, where the difficulty of navigation has been obviated by the construction of a canal, extending from Drumshanbo to Battlebridge. Another canal, about a mile long, avoids the rapids between Jamestown and Drumsna. [SHANNON.]

Beyond the range of Lackagh and the table-land occupied by the lake of Belhavel rise four detached mountain groups, including, with the heights of Lackagh, five distinct valleys, which unite in a pleasantly situated plain occupying nearly the centre of the northern division of the county. The town of Manor Hamilton and the village of Lurganboy are situated close to one another in the common terminus of these valleys, and through these towns the entire inland communication between Leitrim and Sligo and the northern counties is carried on. Of these valleys the best defined are those of the Upper and Lower Bonnet. The Bonnet, taking its rise from Glenade Loch, near the north-western extremity of the county, runs south-east between the heights of Dartry on the north, and a prolongation of the range of Benbulben in Sligo on the south, to within a mile of Manor Hamilton, where it is joined by the Owenmore descending from a valley between the eastern flank of the Dartry mountains and the western declivity of Dooey. After its junction with the Owenmore, the Bonnet changes its direction to south-west, and runs with a winding course by Dromahair into the eastern end of Loch Gill, the waters of which are alternately discharged into the Bay of Sligo. The valley between Dromahair and Manor Hamilton is formed by the brow of Lackagh on the eastern side, and on the west by the mountain of Benbo and its subordinate range. Benbo, though not exceeding 1400 feet in height, from its shape and position has a striking appearance. The slopes on each side of the valley are well wooded, and the whole scene is one of considerable beauty. North of the group of Benbo lies the valley of Glencar watered by the Differen, which however runs westward by Glencar lake and a wooded defile through the northern part of Sligo to the sea. Glanfarn is another valley terminating in the open country round Manor Hamilton. It lies nearly due east and west in an opposite direction from Glencar, and is watered by a considerable river running eastward into Loch Macnean. The valley is bounded by the northern brow of Lackagh on the south, and by the heights of Dooey on the north, the mountains rising on each side to a height of 1400 to 1500 feet. Steep sides and flat extended summits are the characteristics of all the mountains in this district of Leitrim, and, although of no remarkable altitude, they severally cover very large areas, so that there is probably not more than one-fourth of the northern district unencumbered. Lochs Macnean and Melvin stretch along the north-

eastern boundary of the county, separating it from Fermanagh, in which they partly lie. They are respectively 3¼ and 7½ statute miles in length, and are pleasingly diversified with wooded islands. The Kilcoo river connects them, and their waters are discharged into the Bay of Donegal by the Drowes, from which latter the bathing village of Bundrowes, at its embouchure, takes its name. At the western extremity of Loch Melvin is the village of Kinloch, in an open tract expanding towards the sea, and contracted on the inland side, between the heights of Dartry and the prolongation of the Benbulben group, forming a continuation of the valley of the Upper Bonnet. The river Duff, which separates Leitrim from Sligo, runs into the Bay of Donegal, at the eastern extremity of the coast-line.

The shore is for the most part a rocky bluff, with a rough stony beach along the foot of it, and is exposed to the whole swell of the Atlantic. A few yawls are kept at Bundrowes; but there is no shelter on any part of the coast for larger craft. Bundrowes has the requisites for constructing a harbour, but the cost would be greater than any contemplated advantage would repay. There are salmon fisheries at the mouths of the Drowes and Duff rivers.

A new road has been lately completed from the sea at Bundrowes, through Glenade to Manor Hamilton, and thence by the west side of Loch Allen to Carrick-on-Shannon and Drumsna. The other principal roads in the northern district of the county pursue the lines of the several villages radiating from Manor Hamilton. The chief roads in the southern district run east and west, connecting the towns and villages which occupy the northern and southern margins of the open limestone country. A line of railroad has been projected from Dublin to Sligo, which would pass through the southern extremity of Leitrim, but it has not been recommended by the Railway Commissioners for Ireland. The Shannon is crossed by seven bridges within the limits of the county.

Climate.—The climate is raw and damp, particularly in the northern parts of the county, owing to the great extent of moory ground and the vicinity of the Atlantic. In the sheltered valleys however, particularly in the vicinities of Dromahair and Manor Hamilton, where there is a kindly soil, vegetation is as luxuriant as in most parts of other counties in the same latitude. The surface of Leitrim was till a comparatively late period well stocked with timber. It is now barer of wood than most of the neighbouring counties; the only traces of the former forests consisting of some copses in Glencar, and a small quantity of old timber preserved in private demesnes.

Geology.—The varieties of surface in Leitrim indicate the internal structure with peculiar precision. The flat-topped mountain groups showing steep escarpments and natural terraces belong to the millstone-grit or Loch Allen coal formation. The undulating open country has the floetz-limestone for its substratum, and the rough coarse land, when not belonging to the Loch Allen basin, generally consists of sandstone, conglomerate, and wacke. The rocks of the Loch Allen coal-district are more analogous to the millstone-grit of the north of England than to coal tracts in general. The series reposes on the splintery limestone which forms the upper member of the carboniferous or floetz-limestone field. First in ascending order occur thick beds of yellowish-white quartzy sandstone with interposed beds of black shale. The edges of these strata present the appearance of terraces. Then succeeds a massive bed of shale which in some parts of the series attains a thickness of 700 feet. The lower beds of this member consist of thin alternations of black shale with impure dark bluish grey argillaceous limestone, containing many of the fossils of the carboniferous limestone formation. The calcareous beds gradually grow thinner as they ascend, and at length disappear, their places being supplied by layers, and frequently by large flattened spheroids, of argillaceous ironstone. The shale associated with the ironstone contains frequent casts of marine organic remains. The beds of ironstone also grow thinner as they ascend, and at length disappear, leaving the upper portion of the shale of a uniform structure. The next member of the series after the massive shale is a stratum of yellow sandstone, in some parts of the district 250 feet thick, associated with beds of true millstone-grit. Alternations of shale and sandstone containing beds of coal succeed wherever the mountains are of sufficient altitude; for it would appear that such a formation had originally extended over the entire district, and that the absence of those members from the lower mountains has been owing to their removal by some abrading and denuding force. At present they remain only on the summits of Sliev-an-ieran, Lugnaculleagh, Lackagh, and on the highest part of the Munterkenny range; and the occurrence of coal in lumps throughout the sandstone, gravel, and blue-clay hills of the south and south-eastern parts of the county confirms the supposition that a portion of the coal formation has been removed, and points at the north-west as the direction from which the denuding agent must have proceeded. The chief workable beds of the district are situated on the summit of the Braulieve Mountains, on the southern side of the valley of the Arigna, where the coal-measures are worked for the purpose of smelting the ironstone with which they are associated.

Where the millstone-grit formation terminates, the floetz-limestone reappears, and occupies the greater portion of the district watered by the Bonnet and its tributaries. The grit and sandstone occur however in the detached formation of Dartry, and a stripe of yellow sandstone and conglomerate, similar to that of the extreme south, intervenes between the external limit of the limestone and the sea. The only primary rock within the county occurs along the western boundary of the valley of the Lower Bonnet, where the granitic and trap formation of the Ox mountains of Sligo is prolonged by the southern and eastern shore of Loch Gill, along the valley of the Bonnet, to within a few miles of Manor Hamilton. Benbo, which rises about the middle of this range, is a mass of gneiss passing into mica slate.

It is surprising that in a country so rich in minerals there should not at present be any mine in operation. The smelting of iron was carried on in several places round Loch Allen while the wood of the native forests lasted, but as no care was taken by coppicing or planting to preserve the supply, there is no longer any fuel of that kind to be had. Lead-ore has been raised near Lurganboy, and copper-ore from the north side of Benbo. Manganese is found in considerable quantities in the neighbourhood of the latter place. Fullers' earth, potters' clay, steatites, and marls are also obtained in the district between Dromahair and Lurganboy. Chalybeate springs are numerous on the borders of the Loch Allen district.

Soil, Cultivation, &c.—The soil is far from kindly even in the open limestone country, being for the most part stiff, cold, and very retentive of wet. The best tracts are along the Shannon, Rinn, and Bonnet rivers, in the vicinity of Drumsna, Mohill, Dromahair, and Manor Hamilton. The principal crops are potatoes, oats, and flax. Wheat is not grown to any considerable extent. The *loy*, or narrow-bladed spade, is still used in the more remote districts, and the potatoe crop is not unfrequently dibbled in with a pointed stick called a 'steveen.' Improved implements of husbandry are scarcely in use among any but the gentlemen farmers. Leitrim is more a grazing than an agricultural county. Large quantities of young stock, chiefly horned cattle, are raised on the pasturable plains of the southern district. The following table exhibits the sales of agricultural produce in the chief market-towns in the years 1826 and 1835.

	Barrels of Wheat.		Barrels of Oats.		Barrels of Rye.	
	1826.	1835.	1826.	1835.	1826.	1835.
Carrick on-Shannon	270	246	2,320	2,160	209	118
Drumsna	average*	483	average	8,987		
Drumshanbo	,,	,,	15,600	23,400		
Jamestown	average	1,449				
Mohill	,,	,,	average	5,200		
Dromod	,,	,,	average	500		
Ballinamore	,,	,,	average	3,565		
Fenagh	average	2,228				
Carrigallen	,,	,,	average	160		
Dromahair	included in sales for Sligo					
Drumkeerin						
Manor Hamilton						

There are no great demesnes of the resident nobility in Leitrim, and the mansions of the resident gentry are not so numerous as in any of the adjoining counties. The neighbourhoods of Carrigallen, Drumsna, Dromahair, and Manor Hamilton are the best situated with respect to the residence of the higher classes; and there are several handsome demesnes on the shores of lochs Melvin and Macnean. The peasantry, who generally speak the English language, are decent in appearance, and have the character of industry and peaceable habits. Their mode of living is however

* On each of the ten years preceding 1835.

very poor, and, generally speaking, they are inferior in physical advantage to the peasantry of the midland counties. The wages of agricultural labourers vary from 6*d.* to 10*d.* per day for 140 working days in the year. Wages are higher in the northern district than in that south of Loch Allen. Turf fuel is everywhere abundant.

Leitrim is divided into the baronies of Rossclogher on the north, containing part of the town of Manor Hamilton (population, in 1831, 1348) and the village of Lurganboy (pop. 134); Dromahair, occupying the remainder of the northern division, containing the villages of Dromahair (pop. 336) and Drumkeerin (pop. 284); Carrigallen on the south-east, containing the towns of Carrigallen (pop. 492), Ballinamore (pop. 312), and the village of Newtowngore (pop. 207); Leitrim on the south-west, containing part of the town of Carrick-on-Shannon (total pop. 1870), the towns of Drumshanbo (pop. 479), Drumsna (pop. 427), Jamestown (pop. 311), and the villages of Leitrim (pop. 274) and Cashcarrigan (pop. 94); and Mohill on the south, containing the town of Mohill (pop. 1606) and the village of Dromod (pop. 162).

Carrick-on-Shannon, formerly Carrick Drumrusk, is incorporated by charter of the 11th James I., but since the year 1826 the corporation have not exercised any functions. It is well situated for trade, having a good bridge over the Shannon, and water communication to Limerick, Dublin, and Loch Allen. It formerly returned two members to the Irish parliament, but was disfranchised at the time of the Union. The town is badly paved and is not lighted. Jamestown, also incorporated by charter of the 19th James I., formerly returned two members to the Irish parliament: it is now disfranchised, and its corporation is extinct. Mohill, Manor Hamilton, and Drumsna are neatly built towns; the other places are inconsiderable.

Leitrim lies partly in the diocese of Ardagh, but chiefly in that of Kilmore. Prior to the Union it returned six members to the Irish parliament. The representation is now limited to two county members. In January, 1836, the constituency consisted of 1491 voters. The assizes for the county are held at Carrick-on-Shannon, where the county gaol and court-house are situated. General quarter-sessions are held at Carrick-on-Shannon, Ballinamore, and Manor Hamilton, at which latter places are sessions, court-houses, and bridewells. The district lunatic asylum is at Ballinasloe, in the county of Galway. The county infirmary is at Carrick-on-Shannon, and there are dispensaries in all the towns and villages. The constabulary force in 1836 consisted of 5 chief constables, 21 constables, 86 sub-constables, and 5 horse, the total cost of maintaining which force amounted to 4633*l.* 12*s.* 8*d.*, defrayed in nearly equal proportions by government and the county. In 1836 the total number of criminal offenders committed to the county gaol was 327, of whom 282 were males and 45 females. Of these 89 males could read and write at the time of their committal, 25 males and 2 females could read only, 144 males and 30 females could neither read nor write, and of 24 males and 13 females the instruction could not be ascertained. The only barrack for troops in Leitrim is at Carrick-on-Shannon.

The spinning and weaving of linens is the only branch of manufacture carried on with activity. There are 4 bleach-greens in the county, which annually finish about 32,000 pieces of cloth, chiefly for the English market. The number of weavers in 1831 was 437, of flax-dressers 33, of reed-makers 2, of millers 54, of tanners 10, and of tobacconists 1. A coarse pottery ware is made near Dromahair, and there is throughout the county a considerable manufacture, for home consumption, of friezes, flannels, and woollen stuffs. The trade of the county, exclusive of the linen business, consists almost wholly in the sale of grain, butter, and live-stock.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort	10,026	..	..	..	..	..	..	50,000
1813	Under Act of 1812	17,899	..	..	..	..	..	..	94,095
1821	Under Act 55 Geo. III. c. 120	21,762	23,001	..	..	..	61,361	63,424	124,785
1831	Under Act 1 Will. IV. c. 19	24,200	25,481	20,937	2,085	2,459	69,451	72,073	141,524

Before the coming of the English, Leitrim formed portion of the territory of Breifne, of which O'Rourk was petty king, and was called Breifne, or Brenny O'Rourk, to distinguish it from Brenny O'Reily, the present county of Cavan. It was by carrying off Devorgil, the wife of Tiernan O'Rourk, king of Breifne, that Dermod MacMurrogh provoked the hostility which forced him to seek the aid of Henry II. The whole of Brenny O'Rourk is said to have been bestowed by King John on De Lacey; the O'Rourks nevertheless continued to maintain their independence until the reign of Elizabeth, when Leitrim was first reduced to shire ground as a separate county by the Lord Deputy Sussex in 1563, or, according to others, by Sir Henry Sidney in 1565. During the earlier period of Anglo-Irish history it is said to have formed portion of the county of Roscommon. Brian O'Rourk, the principal man among the native Irish of the county, resented the introduction of the English laws; and after many bickerings with Sir Richard Bingham, president of Connaught, broke out into open rebellion in 1588. He was assisted by MacSwiny, and had a body of Munster troops in his pay, with whom he held the castle of Dromahair until compelled to retreat towards Donegal by Sir Richard Bingham and the earl of Clanrickard. Disputes having occurred between him and the leader of the Munster auxiliaries, he was soon after driven to take shelter with MacSwiny in Donegal. From thence he fled to Scotland, where he was delivered to the English authorities by James VI., and was finally carried to London, and there tried for treason and executed. It is related of him by Lord Bacon that he petitioned to be hanged with a withy, after his own country fashion. On the breaking out of O'Donnell's rebellion, in 1596, Tieg O'Rourk, the son of Brian, joined the insurgents, but submitted 14th February, 1597. In June of the same year however he resumed arms, and with Maguire defeated Sir Conyers Clifford in a pass of the Curlew mountains, with considerable loss to the English. He finally submitted in 1603, and took out a patent of the residue of his estate, which had been allotted to him on an English tenure. By an inquisition, taken in 1615, the king's title to the greater part of Leitrim was affirmed, and numerous patents were granted to undertakers by a commission appointed for the purpose of disposing of the estates of the crown in Leitrim, Longford, and King's County. On the breaking out of the rebellion of 1641, the native Irish, headed by Sir Owen O'Rourk, seized all the places of strength in the county, with the exception of the castles of Carrickdrumrusk and Manor Hamilton, the latter of which had been built a short time before by Sir Frederic Hamilton, one of the grantees under the commission. Jamestown, a castle of Sir Charles Coote's, also held out until 1645, when it was taken by Lord Taaffe. The Roman Catholic prelates and clergy assembled here in 1650; and having nominated agents to treat with foreign powers on their behalf, concluded their synod, August 12th, by fulminating a decree of excommunication against the marquis of Ormond and all his adherents. The confiscations which followed on the termination of these wars included almost all the lands that had been allowed to remain to the native proprietors under former attainders, and may be said to have extinguished the family of O'Rourk. The forfeitures consequent on the war of the revolution of 1688 do not appear to have extended to Leitrim, which, from its remote situation, was little affected by the military operations of that æra. In 1798 the county was traversed from north to south by the French under Humbert, who, after taking Castlebar [Mayo] marched northward through the county of Sligo to Droma

hair, and thence across the southern district of Leitrim to Ballinamuck, on the borders of Longford, where, after a short resistance, he surrendered to Earl Cornwallis.

The remains of antiquity in Leitrim are not very interesting. There are some ruins of the abbey of Fenagh, founded by St. Caillin in the fifth century, and celebrated during the early period of Irish church history as a school of divinity. The abbey of Creevlea, near Dromahair, founded by the wife of Owen O'Rourk in 1508, was an extensive pile, of which the principal walls are still standing: it contains some curious tombs and monuments. The remains of the other religious houses are insignificant. O'Rourk's Hall at Dromahair, Castle Longfield, Cloncarrick Castle, Castle Car, and several others now in ruins, belonged to the O'Rourks. Jamestown and Castlefore castles were built by Sir Charles Coote in the early part of the seventeenth century. Dromahair Castle, of which the gables are still standing, was erected in 1628 by Sir William Villiers. The strongest and handsomest fortalice however in the county is the castle of Manor Hamilton, built about the same period by Sir Frederic Hamilton. It is quoined and corniced with cut stone, and is surrounded by a regular rampart with four bastions.

The county expenses are levied by grand jury assessments. The amount assessed in 1835 was 15,638*l.* 12*s.* 10*d.*, of which 2107*l.* 0*s.* 10*d.* was for roads and bridges charged to the county at large; 2794*l.* 7*s.* 4½*d.* was for those of the baronies; 5291*l.* 8*s.* 11*d.* for public buildings, salaries, &c.; 2338*l.* 3*s.* 7½*d.* for police; and 3107*l.* 12*s.* 1*d.* for repayment of loans from government.

(*Statistical Survey of Leitrim*, Dublin, 1802; Griffith's *Account of the Connaught Coal Tract; Report of Railway Commissioners for Ireland;* Cox's *History of Ireland; Parliamentary Reports and Papers.*)

LELAND, or LAYLONDE, JOHN, an eminent English antiquary, was born in London in the beginning of the sixteenth century, and educated at St. Paul's school under the celebrated William Lily. He first entered at Christ's College, Cambridge, where he is said to have been a Fellow, but afterwards removed to Oxford, and passed several years in All Souls College, where he prosecuted his studies not only in Latin and Greek, but in Saxon and Welsh. From thence he went to Paris and learned French, Italian, and Spanish. On his return home he entered into orders, and being esteemed an accomplished scholar, King Henry VIII. made him one of his chaplains; gave him the rectory of Popeling in the marches of Calais in 1530; appointed him his library-keeper; and by a commission dated in 1533 dignified him with the title of his Antiquary. By this commission he was ordered to make search after England's antiquities, and peruse the libraries of all cathedrals, abbeys, colleges, and other places where 'records and the secrets of antiquity were deposited:' a stipend was allotted to him: and he received a dispensation for non-residence upon his living. He spent six or seven years in travelling through England and Wales, collecting materials for the history and antiquities of the nation; and noticed in his journey not only the more important manuscripts which he met with, but all the localities and local antiquities of the country of whatever description, the rivers, forests, chases, woods, cities, castles, manor-houses, monasteries, colleges, and everything that seemed memorable. In 1542 Henry VIII. presented him to the rectory of Hasely in Oxfordshire, and the year following to a canonry of King's College, now Christ Church, Oxford. In 1545, upon the surrender of that college to the king, he lost his canonry, but seems to have been compensated for it in the prebend of East and West Knowle in the cathedral of Sarum. In that same year, having digested into four books that part of his collections which contains an account of the illustrious writers in the realm, with their lives and monuments of literature, he presented it to his Majesty, under the title of 'A Newe Year's Gift,' with a scheme of what he intended to do further for the general history and topography of England and Wales. For the purpose of digesting his collections he retired to a house of his own in the parish of St. Michael-le-Querne in London.

In 1547 Leland's royal patron died, and the attention of the Court, according to Bale, became slackened toward his labours. Whether this was really the cause of the disorder by which he became afflicted is matter of doubt, but within a year or two he became insane: and his distemper being made known to King Edward VI., his Majesty by letters patent, dated March 5th, 1550, granted the custody of him, by the name of John Layland the Younger, to John Layland the Elder, 'with all his lands, tenements, rents, &c., in as large and ample manner as the said John the Younger, being in his right mind, had the same.' In this state he continued, without recovery for two years, when he died, April 18th, 1552. He was interred in the church of St. Michael-le-Querne, which then stood at the west-end of Cheapside, between the conduit and Paternoster-row.

Leland's papers, upon his death, were committed by King Edward VI. to the custody of Sir John Cheke; but subsequently became dispersed. Sir John Cheke, being obliged to go abroad, left four volumes of Leland's Collections in the hands of Humphry Purefoy, Esq., from whom they descended to Burton, the historian of Leicestershire, who, having obtained possession of eight other volumes of Leland's manuscripts containing his 'Itinerary,' deposited the whole, in 1632, in the Bodleian Library at Oxford.

Part of a volume of Leland's Collections, in his own handwriting, will be found in the Cottonian MS. Julius C. VI., in the British Museum; and it is probable that other libraries contain fragments of his productions. He and Nicholas Udall, between them, prepared the verses in English and Latin which were spoken in the Pageant as Anne Boleyn went to her coronation.

The publications by which Leland is most known are his 'Commentarii de Scriptoribus Britannicis,' not very faithfully edited by Anthony Hall, 2 vols. 8vo., Oxon, 1709; his 'Itinerary,' published by Thomas Hearne, 9 vols. 8vo., Oxford, 1710-12; reprinted as the third edition in 1770; and 'De Rebus Britannicis Collectanea,' edit. Thoma. Hearne, 6 tom. 8vo., Oxon, 1715; reprinted at London in 1770.

(*Lives of Leland, Hearne, and Wood*, 2 vols. 8vo., 1772; Chalmers's *Biogr. Dict.*, vol. xx.; Bliss's edit. of Wood's *Athenæ Oxonienses.*)

LELAND, JOHN, D.D., born 1691, died 1766, was of a Presbyterian family in Lancashire, but his father removed while he was very young to Dublin. He was designed for the ministry, and early in life he became pastor of a congregation of Presbyterian Dissenters in Dublin, and in that situation he spent the remainder of his life. He received his degree of Doctor of Divinity from the university of Aberdeen.

Dr. Leland's name would not however have found its way into these columns had he pursued the course of a useful and pious minister only. His claim to notice rests on various works of which he was the author, in the great controversy of the age in which he lived, on the truth and divine origin of Christianity. His first work, published in 1733, was an answer to Tindal's 'Christianity as old as the Creation.' In 1737 he encountered Dr. Thomas Morgan's work, entitled 'The Moral Philosopher;' and in 1742 he published an answer to a tract entitled 'Christianity not founded on Argument.' In 1753 he published 'Reflections' on such parts of Lord Bolingbroke's 'Letters on History' as relate to Christianity and the Scriptures.

All these works are esteemed valuable defences of Christianity; but his principal work is entitled 'A View of the principal Deistical Writers that have appeared in England in the last and present Century; with Observations upon them.' This work first appeared in its original form in 1754.

LELAND, THOMAS, born 1722, died 1785, a divine, scholar, and historical writer, was a native of Dublin, but not, we have reason to believe, at all connected with the Presbyterian minister just mentioned. He was educated at Trinity College, Dublin, and became early in life a Fellow of that Society, which placed him in a state of independence, and enabled him to devote himself to the pursuit of knowledge and truth, for which he was remarkable through the whole course of his life.

His principal works are, 'A Translation of Demosthenes,' 1756-1770; 'A History of the Life and Reign of Philip of Macedon,' 1758; 'A Dissertation on the Principle of Human Eloquence,' 1764, one of the many works that arose out of the publication, by Bishop Warburton, of his 'Divine Legation of Moses;' 'A History of Ireland,' 1773.

Dr. Leland was an admired preacher, and after his death a collection of his sermons, in three volumes, was published

LE'LEGES. The history of this people is involved in great obscurity, in consequence of the various and almost contradictory traditions which exist concerning them; ac-

cording to which, they are on the one hand represented as among the earliest inhabitants of Greece, while on the other they are said to be the same people as the Carians. According to Herodotus, the Carians, who originally inhabited the islands of the Ægean Sea, were known by the name of Leleges before they emigrated to Asia Minor (i. 171); and according to Pausanias, the Leleges formed only a part of the Carian nation (vii. 2, § 4). The Leleges appear, from numerous traditions, to have inhabited the islands of the Ægean Sea and the western coasts of Asia Minor from a very early period. In Homer they are represented as the allies of the Trojans; and their king Altes is said to be the father-in-law of Priam. (*Il.*, xx. 96; xxi. 86.) They are said to have founded the temple of Hera in Samos (Athen. xv., p. 672, Casaubon); and Strabo informs us that they once inhabited, together with the Carians, the whole of Ionia (vii., p. 331).

On the other hand, in the numerous traditions respecting them in the north of Greece we find no connection between them and the Carians. According to Aristotle (quoted by Strabo, vii., p. 322), they inhabited parts of Acarnania, Ætolia, Opuntian Locris, Leucas, and Bœotia. In the south of Greece we again meet with the same confusion in the traditions of Megara respecting the Leleges and Carians. Car is said to have been one of the most antient kings of Megara, and to have been succeeded in the royal power, after the lapse of twelve generations, by Lelex, a foreigner from Egypt. (Paus., i. 39, § 4, 5.) Pylus, the grandson of this Lelex, is said to have led a colony of Megarian Leleges into Messenia, where he founded the city of Pylus. (Paus., iv. 36, § 1.) The Lacedæmonian traditions, on the contrary, represent the Leleges as the original inhabitants of Laconica. (Paus., iii. 1 § 1.)

It can scarcely be doubted, from the numerous traditions on the subject, that the Leleges were in some manner closely connected with the Carians; though it seems improbable that they were, according to Herodotus, the same people. The Carians are universally represented as a people of Asiatic origin; while the principal and apparently earliest settlements of the Leleges were on the continent of Greece. With the single exception of the Megarian tradition mentioned above, the Leleges are nowhere represented as foreign settlers. If we might venture to form an opinion upon such a doubtful subject, we should be disposed to regard the Leleges as a people of Pelasgian race, a portion of whom emigrated, at a very early period, from the continent of Greece to the islands of the Ægean Sea, where they became connected with the Carians, and subsequently joined them in their descent upon Asia Minor.

(Kruse's *Hellas*; Wachsmuth's *Historical Antiquities of the Greeks*; Thirlwall's *History of Greece*; *Philological Museum*, No. 1, art. 'Ancæus.')

LELY, SIR PETER (or Peter Vander Faes), was born in 1617, at Soest in Westphalia. He was placed, at what age does not appear, under Peter Grebber at Haarlem, an artist of considerable merit, whose school was in high esteem. Lely continued two years with him. He acquired great reputation by his portraits, and was appointed state painter to King Charles II., who probably became acquainted with him when he was in Holland. He is especially eminent for his talent in giving a pleasing representation of female beauty. His pencil was light and delicate, his colouring very beautiful, the tone warm, clear, and full, and his execution often spirited. The airs of his heads and his figures are pleasing and graceful, and the attitudes easy and unaffected. The hands of his figures are painted with remarkable care and delicacy. His draperies are arranged, with an appearance of negligence, in broad folds. He sometimes gave his pictures a landscape background in a style peculiarly calculated to give relief to his figures. He occasionally painted historical pictures, one of the best of which is a representation of Susannah and the Elders, at Burleigh House. His most celebrated performance is the series of portraits of the beauties of the Court of King Charles II., preserved at Hampton Court. Lely equally excelled as a crayon painter, and his portraits in that style are esteemed equal, and by some are preferred, to his paintings in oil. He died in England in 1680, at the age of 63.

LEMAN LAKE, *Lemānus Lacus*, *Lake of Geneva*, *Genfersee* (German), one of the largest lakes in Europe, extends in the form of a crescent from east to west between Switzerland and Savoy. Its northern or convex bank, which forms an arc of about 53 miles in length, not reckoning the sinuosities, belongs to the Swiss canton of Vaud, and the southern or concave side, forming an arc of 46 miles, belongs for the greater part to Savoy, the canton of Geneva possessing about eight miles of it at the south-western, and the canton of Valais four miles of it at the south-eastern extremity. Its breadth varies greatly, being between eight and nine miles in the middle, four miles towards the eastern extremity between Vevay and St. Gingouph, three miles in its western part opposite Nyon, after which it becomes narrower and narrower, being reduced to one mile just before reaching Geneva. This narrow part, which is about 14 miles in length from Nyon to Geneva, is called the Little Lake, and more especially the Lake of Geneva. The greatest depth of the Leman, below the cliffs of Meillerie on the coast of Savoy, is nearly 1000 feet; it is 500 feet deep near the castle of Chillon, on the opposite coast, and from 600 to 300 feet in other places. The lake seldom, if ever, freezes; the temperature of its water below 150 feet depth is 41° of Fahrenheit. Its surface is 1150 feet above the sea, but in summer it rises sometimes from six to eight feet higher, owing to the melting of the snows in the Alps. The water reflects a bright azure tinge like that of the Mediterranean sea. The Rhone, coming from the Valais, enters the lake at its south-east extremity, where the waters of the river are muddy coloured; and it issues out of it again at Geneva at the south-west extremity, where its waters assume a deep blue tinge. The other rivers that enter the lake are, 1, the Dranse on the Savoy side, coming from the Alps of Faucigny; 2, the Venoge, on the northern or Swiss side, which rises in the Jura and enters the lake between Morge and Lausanne; 3, the Vevayse, a mountain-torrent, which rises in the canton of Freyburg, and enters the lake near Vevay. Though the Leman lake does not abound so much with fish as most of the other Swiss lakes, still it affords some very fine and large sorts, especially trouts, pike, carp, perch, and a species called 'omble chevalier,' which is much esteemed. The east and north-east winds are the most violent on this lake, and when they blow fresh for some time the waves rise to a considerable height, and the surface of the lake resembles an agitated sea. The most dangerous wind is the Bornand, or south wind, which blows in sudden gusts from the mountains of Savoy. The traffic-boats are few and clumsily built, and cannot stay out in bad weather. A regular communication has been established for some years all along the northern coast from Villeneuve to Geneva by means of two steam-boats, the Leman and the Winkelried, which ply every day in opposite directions. The scenery around this lake has been always a subject of admiration to travellers. The mountains of the Chablais, being a lower offset of the Alps, rise dark and abrupt along the southern shore, some of their summits being 5000 feet above the lake, and beyond them, through their openings, the spectator from several points of the Swiss coast sees the higher Alps of Faucigny and Mont Blanc itself covered with perpetual snow. The eastern extremity of the lake presents the wild and imposing scenery of the narrow deep entrance into the Valais between the lofty groups of the Dent de Morcle and Dent du Midi, between 8000 and 9000 feet high above the lake, while the northern or Swiss coast displays a milder and more cheering landscape of hills rising, in the form of an amphitheatre, covered with vineyards and gardens, and studded with numerous towns and villages having all the appearance of comfort and industry.

(Leresche, *Dictionnaire Géographique de la Suisse.*)

[Lakes.]

LEMBERG, one of the nineteen circles of the Austrian kingdom of Galicia, is situated nearly in the centre of the country. The area is variously stated by different authors; 975 square miles is probably near the truth. The population, by the census of 1826, was 166,118; and as it appears from the census that the increase had been 10,000 in four years, it may be presumed that the population would now (1838) probably approach 200,000, but for the ravages of the cholera in 1831. The face of the country is undulating, but without any high mountains. To the west of the city of Lemberg there is a range of low hills, and woods are common. The soil is sandy, stony, and in parts swampy and unproductive.

LEMBERG, the capital both of the circle and of the whole kingdom of Galicia, lies in 49° 52′ N. lat. and 24° E. long. It is situated in a narrow valley, which winds round an alluvial sand-hill, and there gradually expands into a

plain. The situation is pleasant, but not suited to a great city, there being no river, and only a small stream, the Peltew, which is dry in summer. The city is 868 feet above the level of the sea. When Lemberg belonged to Poland it was a very ill-built place, consisting chiefly of wooden houses; but it has been extremely improved since it came into the possession of Austria. There are now many handsome buildings, broad straight streets, and lofty houses built of freestone, which, with the cupolas and steeples of the cathedrals and churches, give the city, especially when viewed at a distance, an air of grandeur. The city was formerly strongly fortified, and made a successful defence in 1666 against the Russians, and in 1672 against the Turks (to whom it however paid 80,000 dollars to raise the siege). In 1704 Charles XII. of Sweden took it by storm; after which the fortifications were not kept in a state of defence, and under Joseph II. they were pulled down, and low ramparts erected instead, which are planted with trees and laid out in public walks. The compass of the city is small, and the largest houses are in the four suburbs. There are in Lemberg a handsome cathedral and thirteen other Roman Catholic churches, an Armenian and a Greek cathedral, a Lutheran chapel, 2 synagogues, and 9 (formerly 33) convents, namely, of Catholics, 4 of monks and 3 of nuns, one Armenian nunnery, and 1 convent of Greek monks. Besides being the residence of the Roman Catholic, Armenian, and Greek archbishops, of the Lutheran superintendent, and a chief Rabbi, of the Governor-General (the Archduke Ferdinand of Este), and all the chief military and civil authorities of the kingdom, Lemberg has a university, two gymnasia, a Roman Catholic and a Greek Catholic theological seminary, and numerous schools of various kinds, with many hospitals, infirmaries, and other charitable institutions. The manufactures have become much more extensive and important within these few years than they formerly were. Lemberg is the most important trading town in Galicia after Brody. The commission trade is very extensive, and an immense amount of business is done at the annual fair, commencing on the 6th January, and in the six weeks beginning on the 14th January, which is called the 'contract time,' when the nobility of Galicia and a vast concourse of strangers, Christians and Jews, resort to this place. The population, without the military and the strangers, was, in 1836, 52,202 according to Mr. Rohrer (*Statistik des Oesterreichischen Kaiserthums*), and he thinks that, with the military, the foreign students, and the numerous strangers, it may be estimated at 60,000, of whom above 20,000 are Jews.

LEMGO. [LIPPE-DETMOLD.]

LEMMA (λῆμμα, literally 'a thing taken or assumed'), a preparatory proposition borrowed from another subject, or from another part of the same subject, and introduced at the point at which it becomes indispensable. Thus, if in a treatise on mechanics it become necessary to prove certain propositions of geometry, those propositions are lemmas. Many writers use the term as if it applied to any necessary preliminary proposition: thus the seventh of the first book of Euclid is with them a lemma to the eighth. But this destroys the peculiar and antient signification of the term, which it is desirable to retain, or else to avoid the word altogether.

LEMMING. [MURIDÆ.]

LEMNIAN EARTH. Occurs in the Isle of Lemnos, whence its name. It is found massive. Fracture earthy. Dull. Has a meagre feel. Soft. Opaque. Colour greyish or yellowish white. Falls to pieces when put into water. It was formerly used in medicine under the name of *Terra Sigillata*.

According to Klaproth it consists of—

Silica	66·0
Alumina	14·5
Oxide of iron	6·0
Soda	3·5
Water	8·5
Traces of lime, magnesia, and loss	1·5
	100·0

LEMNISCATA, a curve (first noticed by James Bernoulli) having the form of an 8, but with the upper and lower parts perfectly symmetrical. It is the locus of the point in which a tangent to an equilateral hyperbola meets the perpendicular on it drawn from the centre. If the equation of the hyperbola be $x^2-y^2=a^2$, that of the lemniscata referred to the same axes is $(x^2+y^2)^2=a^2(x^2-y^2)$, and its polar equation is $r^2=a^2\cos.2\theta$. If the hyperbola be not equilateral, and its major and minor semi-axes be a and b, the locus above described is still a curve of the same form; and if

$$\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$$

be the equation of the hyperbola, that of the new lemniscata is

$$(x^2+y^2)^2=a^2x^2-b^2y^2.$$

A great many different curves might be assigned, having the same form: an instance is $y^2=mx^2(a^2-x^2)$.

(Peacock's *Examples, &c.*; Legendre, *Exercices du Calcul Intégral.*)

LEMNOS, one of the northern islands of the Ægean Sea, situated nearly half-way between Mount Athos and the entrance of the Dardanelles, and about 22 miles south-west of Imbros. Its area is about 147 square miles, and its population 8000, all Greeks, with the exception of the Turkish garrison and governor, who resides in the castle above the head town or village of the island. The modern Greeks call both the island and the town Stalimene. The surface is hilly, but the hills are not very high; the western part of the island, which is more fertile than the eastern, produces wine and corn, hemp and flax, and fruits, but it is deficient in timber trees and in wood for fuel. The principal harbour, called Sant Antonio, in the south-west part of the island, is large and safe, and might be a useful station for a squadron in those seas. The Russian fleet, in 1770, after burning the Turkish fleet at Tschesmé, sailed to Lemnos, and landed troops on the island to besiege the castle, when Hassan Bey, afterwards known as Capudan Pacha, conceived the bold scheme of driving them out of the island. He embarked at Tenedos, with about 3000 volunteers, in boats, landed on the island of Lemnos unperceived by the Russians, surprised their camp, and drove them in confusion to their ships, which immediately weighed anchor and sailed, leaving Hassan and his raw volunteers masters of the field.

Lemnos is known, in antient mythology, as the spot on which Vulcan fell after being hurled down from heaven, and where he established his forges. A volcano which once was burning on the island may have afforded ground for the fable. A story is also recorded by Herodotus and other antient writers, of the women of Lemnos having murdered all the men, except their king Thoas, who was concealed by his daughter Hypsipyle. The Pelasgi, being driven out of Attica, are said to have taken possession of Lemnos; and it is also said that, having stolen some Athenian women, and carried them to the island, the children of these women despised their half-brethren, born of Pelasgian women; in consequence of which, the Pelasgians took the resolution of murdering both the Athenian women and their children. In consequence of these atrocities, Lemnos had a bad name among the antient Greeks. The Athenians, led by Miltiades, took Lemnos after their conquest of the Chersonesus. (Herod., vi. 140.) A labyrinth is mentioned by Pliny (*Hist Nat.*, xxxvi. 19) as having existed on the island, like those of Egypt and Crete, adorned with 150 columns, and with gates so well poised that a child could throw them open. Pliny says that it was constructed by three native architects, whose names he mentions, and that remains of it existed in his time. Lemnos had two towns, Hephæstiæa and Myrina; the present castle is supposed to be on the site of the latter.

The 'terra sigillata' of Lemnos [LEMNIAN EARTH] is a kind of earthy substance, which was once, and is still supposed by Greeks and Turks to have wonderful medicinal properties. It is dug out of a hill in the island, with great ceremony, and at particular times, in presence of the Turkish Sandjak, or governor, and the Greek clergy, and is shaped into little balls, stamped with the governor's seal. The governor makes a traffic of it, and sends it to Constantinople and other places. It is also used for tanning leather. (Herod., vi. 137, &c.; Choiseul Gouffier, *Voyages en Grèce*; Dapper, *Description des Isles de l'Archipel.*)

LEMON. [CITRUS.]

LEMONS, ACID OF. [CITRIC ACID.]

LEMONS, SALT OF. [OXALIC ACID.]

LEMURIDÆ. Linnæus, in his 'Characteres Mammalium,' defines *Lemur*, the third genus of his *Primates*, thus: 'Dentes primores inferiores 6.' In the body of the work

(*Syst. Nat.*) he characterizes the genus as follows:—Upper incisors (primores) 4; the intermediate ones remote; lower incisors 6, longer, prominent (porrecti), compressed, parallel, and approximate. Canines (laniarii) solitary, approximate. Molars numerous (plures), sublobate, the anterior ones longer and more acute. The genus consists of the *Lemures tardigradus, Mongoz, Macaco, Catta,* and *volans*. To these species Gmelin added *Indri, Potto, Cattu, murinus, bicolor,* and *laniger*.

Cuvier remarks that the *Makis* (*Lemur*, Linn.) comprehend, according to Linnæus, all the *quadrumana* which have, in the one or the other jaw, incisors which differ in number from four, or are at least otherwise directed than in the Monkeys (*Singes*). This negative character, Cuvier observes, could not fail of embracing considerably different beings, and did not even collect all those which ought to be together. He goes on to notice that M. Geoffroy has established in this genus many divisions much better characterized. These animals have all the four thumbs well developed and opposable, and the first hind finger or toe armed with a pointed and raised nail or claw, whilst all the other nails are flat. Their fur is woolly; their teeth begin to exhibit pointed tubercles fitting into each other (engrenant les uns dans les autres), as in the *Insectivora*. The following groups are adopted by Cuvier:—

1. The Makis, or Macaucos, properly so called, *Lemur*.
2. The Indris, *Lichanotus*, Illiger.
3. The Loris group (Slow Lemurs, *Stenops*, Illiger).
4. The Galagos, *Otolicnus*, Illiger.
5. The Tarsiers, *Tarsius*.

Mr. Gray arranges the *Lemuridæ* as the third family (*Quadrupedoid*) of the order *Primates*, Linn., and he thus characterizes the family:—

Grinders 6—6 above, 5—5 below: nostrils terminal; extremities free, first finger of the hind feet armed with recurved claws.

† Head long; grinders blunt.

1. *Lemurina:* genus *Lemur*, Linn. 2. *Lichanotina:* genera *Indris*, Lacép., *Lichanotis* (*Lichanotus*), Ill.

†† Head round.

3. *Loridina:* genera *Loris*, Geoff., *Nycticebus* (Nycticebus), Geoff. 4. *Galagonina:* genera *Otolicnus* (Otolicnus), Illig., *Galago*, Adams, *Cheirogallus* (Cheirogaleus), Geoff. 5. *Tarsina:* genus *Tarsius*. 6. *Cheiromina:* genus *Cheiromys*, Cuv.

Mr. Swainson makes the *Lemuridæ* his third family of *Quadrumana*, with the following characters:—

Form approaching that of quadrupeds; cutting teeth $\frac{4}{4}$ or $\frac{4}{6}$; canine $\frac{1-1}{1-1}$; grinders $\frac{5-5}{5-5}$ or $\frac{5-5}{4-4}$, obtusely tubercular; head long, triangular; nostrils terminal; ears generally concealed, very small.

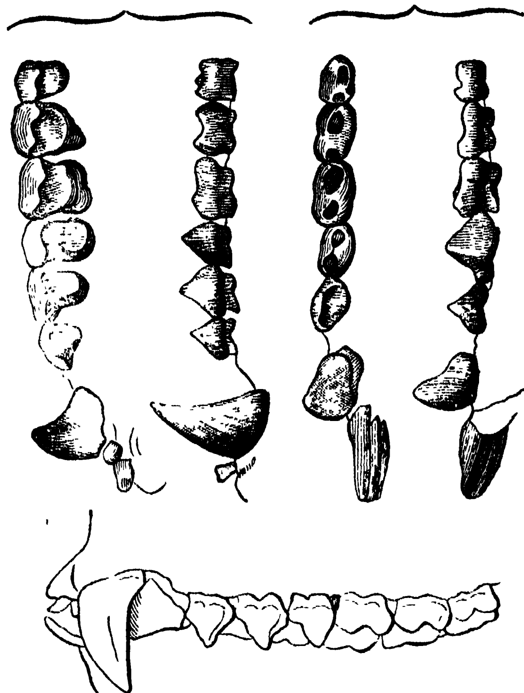
The following genera are comprised by the author last mentioned under this family: *Lemur*, Linn., *Indris*, Lacép., *Lichanotus*, Ill., *Scartes*, Sw., *Stenops*, Ill., *Otolicnus*, Geoff., *Cephalopachus* (Tarsius Bancanus, Horsf.), *Tarsius*, Storr., *Aotes*, Humb., *Galeopithecus*, Pallas, *Cheirogaleus*, Geoff.

The author of 'The Natural History of Monkeys, Lemurs, and Opossums,' * divides the Mammals with opposable thumbs into three sections, like Storr; and the author's arrangement is almost the same, differing only in the removal of the *Simiadæ* or *Prosimia*, as Storr calls them, from the second to the third section in consequence of observations made since Storr's time. The author observes that the coincidence is the more remarkable, inasmuch as the arrangement of Storr was unknown to him till long after the publication of his own views. [CHEIROPEDS, vol. vii.] The author makes his second section of *Cheiropeds* consist of the *Quadrumana*, or those which have opposable thumbs on both fore and hind hands; and he divides the section into two subdivisions, the first consisting of the *Simiæ* (with anthropoïd teeth), and the second of the *Lemuridæ* (with abnormal teeth). The genera arranged by him under this last subdivision are *Lichanotus, Propithecus, Lemur, Otolicnus, Cheirogaleus, Stenops, Tarsius, Cheiromys,* and *Galeopithecus*.

Mr. Gray's subfamily *Lemurina* contains the true Lemurs or Macaucos.

The genus *Lemur* properly so called is thus characterized:—Dental formula:—Incisors $\frac{4}{6}$; canines $\frac{1-1}{1-1}$, molars $\frac{5-5}{4-4} = 32$.

M. Geoffroy maintains that the number of incisors in both jaws is equal, coinciding with the number in the Monkeys, the two outermost of the six, which are larger than the rest, being, according to him, the true canines; while the teeth commonly called canines are, in his opinion, only the first series of molars. 'This conjecture,' says Mr. Bennett, 'unquestionably derives considerable strength from the fact that when the animal closes its mouth the supposed canines of the lower jaw pass behind those of the upper, a position directly contrary to that which they uniformly assume in every other animal that is furnished with that kind of teeth.'



Teeth of Lemur, more than one third larger than nature (F. Cuvier.)

The muzzle is very pointed, the tail very long, the fur woolly and soft, and there are two pectoral *mammæ*. The structure of the hands and nails is mentioned above. (Cuvier's description of the Makis.)

Geographical Distribution and Habits.—'The whole of the genus thus characterized,' writes Mr. Bennett, in his 'Tower Menagerie,' 'are natives of Madagascar, and of two or three of the smaller islands in its immediate vicinity. They appear to occupy in that remarkable and very imperfectly known country the place of the Monkeys, none of which have yet been detected within its precincts. They are said to live in numerous troops upon the trees, and to feed upon fruits and insects; but their habits in a state of nature have not yet been observed with sufficient accuracy to enable us to form any clear idea of their mode of existence. In captivity they are particularly tame and good-tempered, fond of being noticed, delighting in motion, and leaping with surprising agility. They are however in some degree nocturnal, and when undisturbed pass a considerable portion of the day in sleep. If alone, they roll themselves up in the form of a ball, and wind their long tail in a very curious manner round their body, apparently for the purpose of keeping themselves warm, for they are naturally chilly, and delight in basking in the rays of the sun, or in creeping as close as possible to the fire. When two of them are confined together, they interlace their limbs and tails after a singular fashion, and, placing their heads in such a position as that each may, if disturbed, see what is going on behind the other's back, fall comfortably asleep.'

There are several species, and all that we have seen, some of them very beautiful, and exhibited in the Zoological Society's Collection at the Regent's Park, have been very mild.

* 'Library of Entertaining Knowledge,' vol. xlii., part 1, Dec. 1838.

We select as an example the *White Fronted Lemur, Lemur albifrons*.

Description.—*Fur* ruddy or bronzed-grey above, whitish below; *male* with the front white; *female* with the same part of a deep grey and a black longitudinal line on the top of the head. M. Lesson remarks that the female is the *Maki d'Anjouan* of M. Geoffroy St. Hilaire, and the *Maki aux pieds fauves* of Brisson.*

The bounding elasticity of this species, when familiar and quite at its ease, is wonderful. It pitches, after a leap of many yards, so lightly as hardly to attract the notice of the ear when it alights. If it take a leap from a table to the back of a distant chair, or even to the upper angle of an open door, it never misses its hold. Under the points of the fingers are elastic cushions, which no doubt assist it in performing these feats. It is a very affectionate animal and a most amusing companion. Our limits will not permit us to indulge in an account of one which we kept, and which was suffered to go at large. When tired with playing about in the evening, its favourite perch was on the instep of the uppermost leg of his master, as he sat cross-legged before the fire. Having obtained leave, he used to take his seat, wrap his boa-like tail round his shoulders and back, and enjoy his nap.



Lemur albifrons.

Mr. Bennett characterized generically, at a meeting of the Zoological Society of London (*Zool. Proc.*, 1830-31), a Lemuridous species, which he states to be probably the animal noticed and imperfectly represented by Bosman under the name of *Potto*. Mr. Bennett names the animal *Perodictus Geoffroyi*, and gives as synonyms *Potto*, Bosman; *Lemur Potto*, Gmel.; *Nycticebus Potto*, Geoff.; and *Galago Guinneensis*, Desm. [PERODICTUS.] The same zoologist (*Zool. Proc.*, 1833) called the attention of the Society to a *Black Lemur* (*Lemur niger*, Geoff.) in the Society's menagerie, expressing his belief that it was the first individual of the species which had fallen under the observation of zoologists since the days of Edwards, the original describer, who saw and figured one which was living in 1755 in London, and whose description and figure were up to 1833 the only proofs of the existence of such an animal. Mr. Bennett added that the *Black Lemur* is the type of the *Lemur Macaco*, Linn.; and that the *Vari*, to which the name of *Lemur Macaco* has been applied by modern authors, is given by Linnæus as Var. d. of that species. Custom having however transferred the specific name to the variety, Mr. Bennett deemed it better to acquiesce in the use which has obtained, leaving to the *Vari* the name of *Lemur Macaco*, and to the *Black Lemur* that of *Lemur niger*. Mr. Bennett also (*Ibid.*, p. 106) characterized a new species as *Lemur rufifrons*.

Those subfamilies and genera which belong to the group in its most extensive sense will be noticed under their proper titles, as far as our limits will permit. The genera *Galago* and *Nycticebus* will be treated of under the titles of OTOLICNUS and STENOPS.

Of *Cheirogaleus* but little is known, and of its dentition, at present, nothing. M. Geoffroy characterized the genus from the drawings and MS. of Commerson.

Generic Character.—*Head* round; nose and muzzle short; whiskers long; eyes large and prominent; ears short and oval; *tail* long, full (touffue), cylindrical, and curled (enroulée); nails of the thumbs flat, and all the other nails subulate; fur short.

This genus is considered by many to be doubtful, though three species are recorded, which we shall presently mention. M. Desmarest only admits them into his 'Mammalogie' in a note.

The three species mentioned in Commerson's manuscript notes are *Cheirogaleus major*, *Cheirogaleus medius*, and *Cheirogaleus minor*, all from Madagascar. M. Geoffroy thinks that the species last named is *Galago Madagascariensis*.

LENA, River. [SIBERIA.]

L'ENCLOS, NINON DE, was born in 1616, of a noble though not very rich family of Touraine. Her mother wished to make her a nun, but her father, who was a man of pleasure, directed his daughter's ideas in a very different course, giving her very loose notions of morality, and preparing her to be, what she became in reality, a devotee to sensual gratification. She lost both her parents at an early age, and finding herself her own mistress, with a moderate independence, she fixed her residence at Paris. Being remarkably handsome and graceful, she was courted by most of the noblemen and wits about court, was very indulgent to all whom she liked, and had a numerous and often renewed succession of favourites. She is said to have been perfectly disinterested in her amours, being herself above want, and having neither ambition nor a passion for hoarding money. Such was the tone of morality in France, in that age, that modest women courted her society, which was considered a model of elegance and fashion; among others, Madame de la Fayette, Madame de Sully, and Madame Scarron, afterwards Madame de Maintenon, often visited her. Christina of Sweden, during her residence in France, was much pleased with her company, and wished to attach her to her little court; but Mademoiselle de l'Enclos preferred her independence. She is said to have retained her attractions to a very advanced age, and to have been the object of a violent attachment at seventy. She was good-tempered and liberal, witty and accomplished. Some of her letters to St. Evremond, which are found in the works of that author, and have been published separately in the 'Lettres de Femmes Célèbres,' edited by L. Collin, 1805, are the only authentic memorials of her pen; other works have been attributed to her, which are apocryphal. She died in Paris, in 1706, at ninety years of age.

LENNEP, JOHN DANIEL VAN, was born at Leeuwarden, in the province of Friesland in Holland, in November, 1724, and was educated at the university of Franeker. In 1747 he edited a Greek poem by Coluthus, which was favourably received by his learned contemporaries. He was elected in 1752 professor of Latin and Greek at Groningen, and after remaining there fifteen years, was appointed to a similar professorship at Franeker. He died the 6th of February, 1771, at Aix-la-Chapelle, whither he had gone for the benefit of his health.

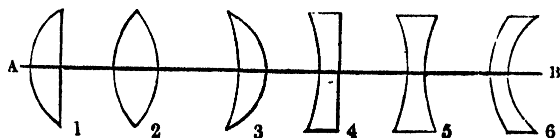
Lennep is principally known by his 'Etymologicum Linguæ Græcæ,' which was published after his death, by his pupil Scheide, 2 vols. 8vo., Utrecht, 1790; it was reprinted in one volume in 1808, under the superintendence of Nagel. This work used to be considered by many scholars a standard book on Greek etymology; but since the study of etymology has been pursued on sound principles, it has been justly regarded as a useless book, full of errors and absurdities. The views of Lennep on etymology in general, and especially on that of the Greek language, are given in a treatise of his entitled 'De Analogia Linguæ Græcæ,' published by Scheide, in the 'Prælectiones Academicæ' of Lennep and Valckenaer, 8vo., Utrecht, 1790.

Lennep was engaged at the time of his death in editing the Epistles of Phalaris, and translating into Latin Bent-

* M. F. Cuvier regards as a conclusive proof of the identity of these supposed different species that a male *Lemur albifrons* and a female of the so-called *Maki d'Anjouan*, confined in the Paris menagerie, produced young. Mr. Mac Leay some time since exhibited at a meeting of the Linnean Society a Lemur, with all the external characters of colour supposed by M. F. Cuvier to be peculiar to the male, which was regarded as a female. But, as Mr Bennett observes ('Gardens and Menagerie of the Zoological Society'), there is a possibility that some error may have occurred in the determination of the sex; and he states that he himself had witnessed such a mistake.

ley's celebrated Dissertations on those Epistles. This work, together with the translation of Bentley, was published in 1777, under the superintendence of Valckenaer, who has given in the preface a brief account of the life and writings of Lennep.

LENS (Latin for 'a small bean'), a name given to a glass, or other transparent medium, ground with two spherical surfaces in such manner as to be generated by the revolution of one or other of the following figures about the axis AB.



(1) is plano-convex; (2) is double-convex; when the radii are equal it is called equi-convex, and when one radius is 6 times the other it is called a crossed lens; (3) is a meniscus; in every such lens the concave side has the larger radius; (4) is plano-concave; (5) is double concave; (6) is concavo-convex.

We shall not here enter upon the laws of optics, but presuming them known, shall collect the principal facts and formulæ connected with the passage of a direct pencil of light, that is, of a pencil whose rays are either parallel to the axis, or converge from or diverge to a point in the axis. We shall follow the notation (for the most part) and formulæ of Mr. Coddington, in his 'Treatise on the Reflexion and Refraction of Light,' Cambridge, 1829, which contains the most complete investigation of the subject which we know of; referring to the work itself for demonstration and extension.

The following figure represents the passage of a pencil of light with parallel rays through a double-convex lens. The rays are not all refracted to a point, but are tangents to a CAUSTIC, which has a cusp at a certain point F, and may be considered with sufficient accuracy as a small portion of a semicubical parabola. If however the aperture of the lens be no considerable portion of a sphere, which is always the case in practice, the rays which pass near the axis are thrown so thick about the point F, that the effect is an

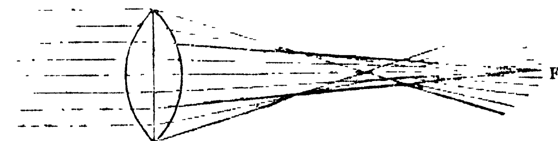
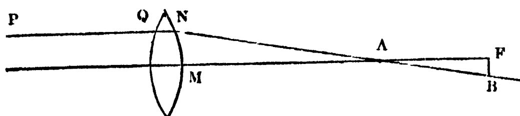


image of the extremely distant point from which the rays come, formed at F. This (for parallel rays) is called the focus of the glass, and its distance from the nearest side of the lens is called the focal distance. The longitudinal aberration of a ray is the distance from the focus at which it passes through the axis, and the latitudinal aberration is the perpendicular distance from the axis at which it passes through a perpendicular drawn through the focus. Thus, in the following figure, FA is the longitudinal, and FB the latitudinal aberration of the ray PQ.



We shall first state the method of finding the focal length of a given lens. Let μ be the index of refraction, or $\mu : 1$ the constant proportion which the sine of the angle of incidence bears to that of refraction (which for plate-glass varies from 1·500 to 1·540; for crown glass, from 1·525 to 1·563; and for flint glass from 1·576 to 1·642); and let R and S be the radii of the two sides of the lens *with their signs*, while r and s are the numerical values of these radii independently of their signs. Also let every convex surface be considered as having a positive radius, and every concave surface a negative one. Let F be the focal distance with its sign, and f the numerical value of the same, it being agreed that the focal distance shall be positive when parallel rays are made to converge, and negative when they are made to diverge, that is, to proceed as if they came from a point on the same side of the glass as that on which they entered. One formula, upon these suppositions, will embrace all the cases; and that formula is

$$\frac{1}{F} = (\mu - 1)\left(\frac{1}{R} + \frac{1}{S}\right)$$

on the supposition that the central thickness of the lens is inconsiderable. But if it be necessary to take this thickness into account, let it be called t, and let R be the radius of the side at which the light enters: then either find F from

$$\frac{1}{F} = (\mu - 1)\left(\frac{1}{R} + \frac{1}{S}\right) + \frac{(\mu - 1)^2}{\mu} \cdot \frac{t}{R^2};$$

or correct F, as found from the preceding formula, by subtracting from its *algebraical* value

$$\frac{(\mu - 1)^2}{\mu} \quad \frac{F^2 t}{R^2}$$

F being found from the preceding: the result is sufficiently correct.

The focal distance, as determined from the first formula, is the same whether the light enter on one side or the other, but the correction for the thickness depends, as we see, upon the side at which it enters.

The application of these formulæ to the several cases is as follows:—We write the distinctive adjective of the lens so that the first part of the word shall denote the part at which light first enters; for instance, plano-convex, or convexo-plane, according as the light first meets the plane or convex surface.

(1). *Plano-convex:* R is infinite, $S = s$.

$$\frac{1}{F} = \frac{\mu - 1}{S}, \text{ or } f = \frac{s}{\mu - 1}.$$

(1). *Convexo-plane:* $R = r$, and S is infinite:

$$\frac{1}{F} = \frac{\mu - 1}{R} + \frac{(\mu - 1)^2 t}{\mu R^2} : f = \frac{r}{\mu - 1} - \frac{t}{\mu}.^*$$

(2). *Double-convex:* $R = r$, $S = s$:

$$\frac{1}{f} = (\mu - 1)\left(\frac{1}{r} + \frac{1}{s}\right) + \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2}.$$

(3). *Convexo-concave meniscus:* $R = r$, $S = -s$, $r < s$

$$\frac{1}{F} = (\mu - 1)\left(\frac{1}{r} - \frac{1}{s}\right) + \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2} = \frac{1}{f}.$$

(3). *Concavo-convex meniscus:* $R = -r$, $S = s$, $r > s$:

$$\frac{1}{F} = (\mu - 1)\left(\frac{1}{s} - \frac{1}{r}\right) + \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2} = \frac{1}{f}.$$

In all the preceding cases F is positive; or all sharp-edged lenses make parallel rays converge: but in those which follow it will be noted that F is negative, or all flat-edged lenses make parallel rays diverge.

(4). *Plano-concave:* R is infinite, $S = -s$.

$$\frac{1}{F} = -\frac{\mu - 1}{s}, \text{ or } f = \frac{s}{\mu - 1}$$

(4). *Concavo-plane:* $R = -r$, S is infinite:

$$\frac{1}{F} = -\frac{\mu - 1}{r} + \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2}: f = \frac{r}{\mu - 1} + \frac{t}{\mu}.^*$$

(5). *Double-concave:* $R = -r$, $S = -s$:

$$\frac{1}{F} = -(\mu - 1)\left(\frac{1}{r} + \frac{1}{s}\right) + \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2};$$

$$\frac{1}{f} = (\mu - 1)\left(\frac{1}{r} + \frac{1}{s}\right) - \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2}.$$

(6). *Convexo-concave:* $R = r$, $S = -s$, $r > s$:

$$\frac{1}{F} = (\mu - 1)\left(\frac{1}{r} - \frac{1}{s}\right) + \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2};$$

$$\frac{1}{f} = (\mu - 1)\left(\frac{1}{s} - \frac{1}{r}\right) - \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2}.$$

(6). *Concavo-convex:* $R = -r$, $S = s$, $r < s$.

$$\frac{1}{F} = (\mu - 1)\left(\frac{1}{s} - \frac{1}{r}\right) + \frac{(\mu - 1)^2}{\mu} \frac{t}{r^2};$$

* These results are only nearly true

$$\frac{1}{f}=(\mu-1)\left(\frac{1}{r}-\frac{1}{s}\right)-\frac{(\mu-1)^2}{\mu}\;\frac{t}{r^2}.$$

If, in any of the preceding, the term involving t be left out, we have the common approximate mode of determining the focus. We now come to the formulæ for determining the aberration in the case of a direct pencil of parallel rays.

Let MN, in the third figure (the perpendicular distance from N to the axis will do equally well) be $= y$; then AF is determined by the following formula:—

$$K=-\frac{\mu-1}{2\mu^2}\left\{\frac{1}{R^3}+\left(\frac{1}{S}+\frac{\mu+1}{F}\right)\left(\frac{1}{S}+\frac{1}{F}\right)^2\right\}F^2y^2$$

where R is the radius of the surface which the light first meets. The algebraical value of MA in the figure is F + K, where F is supposed corrected for the thickness. If we assume

$$X=\frac{S-R}{S+R};\text{ then }K=-\frac{Ay^2}{8F};$$

where A stands for

$$\frac{1}{\mu(\mu-1)}\left\{\begin{array}{l}\frac{\mu+2}{\mu-1}X^2-4(\mu+1)X\\ +(3\mu+2)(\mu-1)+\frac{\mu^3}{\mu-1}\end{array}\right\}$$

The following are the results, assuming $\mu=\frac{3}{2}$, which is near enough (if the material be glass) for determining this correction. This supposition gives (x being the numerical value of X, independently of sign)

$$K=-\frac{7X^2-10X+10}{6}\cdot\frac{y^2}{F}.$$

(1). *Plano-convex:* $X=-1 \qquad K=-\frac{9}{2}\frac{y^2}{F}.$

(1). *Convexo-plane* · $X=1 \qquad K=-\frac{7}{6}\frac{y^2}{F}.$

(2). *Double-convex:* light entering at the more convex side.

$$x=\frac{s-r}{s+r},\quad K=-\frac{7x^2-10x+10}{6}\;\frac{y^2}{F}.$$

(2). *Double-convex:* light entering at the less convex side·

$$x=\frac{r-s}{r+s},\quad K=-\frac{7x^2+10x+10}{6}\;\frac{y^2}{F}.$$

(3). *Convexo-concave meniscus:*

$$x=\frac{s+r}{s-r},\quad K=-\frac{7x^2-10x+10}{6}\;\frac{y^2}{F}.$$

(3). *Concavo-convex meniscus.*

$$x=\frac{r+s}{r-s},\quad K=-\frac{7x^2+10x+10}{6}\;\frac{y^2}{F}.$$

(4). *Plano-concave:* same * as plano-convex.

(4). *Concavo-plane:* same as convexo-plane.

(5). *Double concave,* light entering at the more concave side: same as double convex, light entering at the more convex side.

(5). *Double concave,* light entering at the less concave side: same as double convex, light entering at the less convex side.

(6). *Convexo-concave:* same as concavo-convex meniscus.

(6). *Concavo-convex:* same as convexo concave meniscus.

Throughout these formulæ the sign of K is opposite to that of F, since $7x^2 \pm 10x + 10$ must always be positive. Hence the point A always lies between the points M and F (third figure). If the point N be placed as high as possible that is, if y be what is called the *semi-aperture* of the lens, then K is the aberration of the extreme ray. It appears also that the longitudinal aberration varies directly as the square of the semi-aperture, and inversely as the focal distance.

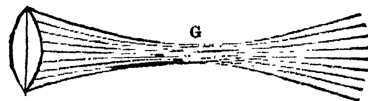
* That is, the aberration has the same formula: but it must be noted that F has different signs in the two lenses.

The aberration is least for a given aperture and focal length, when $x=\frac{5}{7}$, which gives $S = 6R$, requiring a double-convex or double-concave lens, in which the radius of the side on which light enters is one-sixth of the other. The convex lens of this kind is what opticians call the crossed lens. The co-efficient of $y^2 \div F$ is $-\frac{15}{14}$.

The latitudinal aberration at the focus (as determined with the correction for the thickness) is $yK \div F$, or (neglecting the sign)

$$\frac{1}{8}A\frac{y^3}{F^2};\text{ for glass }\frac{7X^2-10X+10}{6}\;\frac{y^3}{F^2}.$$

But if we observe the rays in the second figure (and the same may be clearly seen in a beam of sun-light thrown into an otherwise dark room through a convex lens) we shall see that the luminous space is bounded by a surface of revolution which narrows and afterwards spreads again, as in



this diagram. The smallest circle (at G) is called the circle of least aberration, and is determined as follows:—Its centre is nearer to the glass than the focus (corrected for the thickness) by three-fourths of the longitudinal aberration of the extreme ray; and its diameter is one half of the lateral aberration of the extreme ray. If then we measure from the corrected focus, we find for the distance of the circle of least aberration (neglecting its sign) from this focus,

$$\frac{3Ay^2}{32F};\text{ for glass }\frac{7X^2-10X+10}{8}\cdot\frac{y^2}{F};$$

and for the diameter of this circle,

$$\frac{Ay^3}{16F^2},\text{ for glass }\frac{7X^2-10X+10}{12}\;\frac{y^3}{F^2}$$

The correction for the thickness, to be subtracted from F as determined by the first equation of all, is

$$-\frac{1}{4\mu}(X+1)^2\cdot t;\text{ for glass }-\frac{1}{6}(X+1)^2\cdot t;$$

which is always algebraically subtractive, whatever the sign of F may be. The following table exhibits this correction, the distance of the circle of least aberration, and its diameter, for the cases above noted. The description of the lens is in the first column, and I stands for plane (or plano), C for concave, and inverted C for convex. The sign of the surface which the light first meets is placed first. Where a great and small letter meet, the small letter shows the side which has the less curvature, or the larger radius.

$$\alpha = 7x^2 - 10x + 10$$
$$\beta = 7x^2 + 10x + 10$$

Lens.	X or x.	Correction for thickness.	Distance of Circle.	Diameter of Circle.
IↃ and IC	$X=-1$	0	$\frac{27}{8}\;\frac{y^2}{F}$	$\frac{9}{4}\;\frac{y^3}{F^2}$
CI and ↃI	$x=1$	$\frac{2}{3}t$	$\frac{7}{8}\;\frac{y^2}{F}$	$\frac{7}{12}\;\frac{y^3}{F^2}$
Cɔ and Ↄc	$x=\frac{s-r}{s+r}$	$(x+1)^2\frac{t}{6}$	$\frac{\alpha}{8}\;\frac{y^2}{F}$	$\frac{\alpha}{12}\;\frac{y^3}{F^2}$
cↃ and ɔC	$x=\frac{r-s}{r+s}$	$(x-1)^2\frac{t}{6}$	$\frac{\beta}{8}\;\frac{y^2}{F}$	$\frac{\beta}{12}\;\frac{y^3}{F^2}$
Cc and Ↄɔ	$x=\frac{s+r}{s-r}$	$(x+1)^2\frac{t}{6}$	$\frac{\alpha}{8}\;\frac{y^2}{F}$	$\frac{\alpha}{12}\;\frac{y^3}{F^2}$
ɔↃ and cC	$x=\frac{r+s}{r-s}$	$(x-1)^2\frac{t}{6}$	$\frac{\beta}{8}\;\frac{y^2}{F}$	$\frac{\beta}{12}\;\frac{y^3}{F^2}$

We have judged it more useful to collect what we may call the *critical* formulæ, by which the fitness of a lens

for any given purpose may be estimated, than to enter upon explanations of optical principles in an isolated article. We shall now give the formulæ only, omitting the detail of cases, when the pencil of rays is not parallel, but proceeds from a point in the axis.

Let U be the distance of the entering pencil from the surface whose radius is R, and V the distance of the focus of the rays on the other side from the surface whose radius is S; U being negative when the entering pencil is divergent, and V negative when the emergent pencil is convergent. Let F be the distance of the uncorrected focus of parallel rays from the surface of emergence, determined as before. Then, if the thickness of the lens be inconsiderable, V is determined from U by the equation.

$$\frac{1}{V}+\frac{1}{U}=\frac{1}{F}=(\mu-1)\left(\frac{1}{R}+\frac{1}{S}\right);$$

V representing the solution of this equation, the more correct value, taking the thickness t into account, is

$$V-\left(\frac{\mu-1}{R}-\frac{1}{U}\right)^2\frac{tV^2}{\mu}.$$

$$\text{Let } X=\frac{S-R}{S+R};\ W=\frac{V-U}{V+U};$$

then the above correction for the thickness is

$$-\left(\frac{X-W}{1-W}\right)^2\cdot\frac{t}{\mu}:$$

and assuming A to stand for

$$\frac{1}{\mu(\mu-1)}\left\{\begin{matrix}\frac{\mu+2}{\mu-1}X^2+4(\mu+1)WX\\+(3\mu+2)(\mu-1)W^2+\frac{\mu^3}{\mu-1}\end{matrix}\right\}$$

the longitudinal aberration is

$$-\frac{A}{8}\frac{V^2}{F^2}\frac{y^2}{F};\ \text{or}\ -\frac{A}{2(1-W)^2}\cdot\frac{y^2}{F};$$

which must be algebraically applied to the value of V (corrected for thickness. The latitudinal aberration is

$$\frac{A}{8}\frac{V}{F}\frac{y^3}{F^2};\ \text{or}\ \frac{A}{4(1-W)}\cdot\frac{y^3}{F^2}.$$

The distance of the least circle of aberration from the corrected focus is

$$-\frac{3A}{32}\frac{V^2}{F^2}\cdot\frac{y^2}{F};\ \text{or}\ -\frac{3A}{8(1-W)^2}\cdot\frac{y^2}{F};$$

and the diameter of the same circle is

$$\frac{A}{16}\frac{V}{F}\frac{y^3}{F^2};\ \text{or}\ \frac{A}{8(1-W)}\ \frac{y^3}{F^2}.$$

When two or more lenses are placed close together, in finding the approximate focal distance, uncorrected for the thicknesses, they may be considered as one lens, whose focal distance has a reciprocal equal to the sum of the reciprocals of the focal distances of the component lenses. Sir J. Herschel has proposed to call the reciprocal of the focal distance the *power* of a lens; in which case it would be said that the power of a compound lens is equal to the sum of the powers of the simple lenses.

For more complicated cases see the work of Mr. Coddington, already cited.

LENS, CRYSTALLINE. [EYE.]

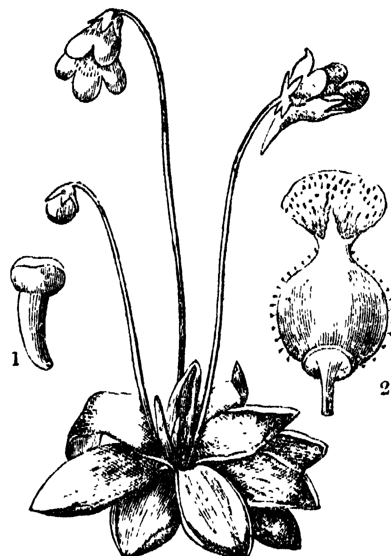
LENS. [PAS DE CALAIS.]

LENT (in Latin, *Quadragesima*), a time of mortification, commemorative of the miraculous fasting of our Saviour in the desert; used as a preparation for Easter. The Saxon term was *Lencten*, implying Spring, the season when the day increases in *length*, about the commencement of which this fast usually falls: it is in fact the Spring-Fast.

In the ancient Latin Church Lent consisted only of thirty-six days: the four additional days began in the ninth century.

Some assert that this Fast was first instituted by the Apostles. Such was the opinion of St. Jerome, St. Leo, St. Augustine, and others. Tertullian speaks of it as of long standing in his time: though some writers date it as low as the third century. It was first observed in England by our Saxon ancestors in 640, by order of Ercombert, King of Kent. (Wheatley *On the Common Prayer*, 8vo., London, 1741, p. 224; Brady's *Clavis Calendaria*, i., 209, 216; Brand's *Popular Antiq.*, vol. i., p. 79.)

LENTIBULA'CEÆ, a small monopetalous order of exogenous plants, resembling Scrophulariaceæ very much in all respects, except that their seeds are arranged upon a free central placenta. Pinguicula and Utricularia are the only genera of this order.



Pinguicula vulgaris.

1, an anther; 2, the glandular ovary, with a two lobed stigma, of which one of the lobes is much larger than the other.

LENTICULI'NA. [FORAMINIFERA, vol. x., p. 348.]

LENTO (Ital., *slowly*), a term in music equivalent to *Largo*.

LENZINITE. Occurs massive. Fracture earthy. Sometimes slightly conchoidal. Hardness 1·5. Easily scratched by the point of a knife. Colour white. Lustre rather greasy. Translucent, transparent on the edges. Specific gravity 1·8 to 2·10.

When put into water it divides into numerous small translucent bits, which, when touched, fall into grains of great hardness; by heat loses 25 per cent. in weight, and becomes hard enough to scratch glass

Dr. John's analysis gives—

Silica	37·5
Alumina . . .	37·5
Water	25
	100·

It is found at Eifeld in Prussia.

LEO I., Emperor of Constantinople, born in Thrace of obscure parents, entered the military service, and rose to high rank. At the death of the Emperor Marcianus, A.D. 457, he commanded a body of troops near Selymbria, and was proclaimed emperor by the soldiers, at the instigation of Aspar, a Gothic chief, who commanded the auxiliaries. The senate of Constantinople confirmed the choice, and the patriarch Anatolius crowned him. This is said to have been the first instance of an emperor receiving the crown from the hands of a bishop. Leo followed the measures of Marcianus against the Eutychians, who had been condemned as heretics, and who had recently excited a tumult at Alexandria, had killed the bishop, and placed one Ælurus in his stead. Aspar, for a time, screened Ælurus; but Leo at last had him exiled, and an orthodox bishop put in his place. The Huns, having entered the province of Dacia, were defeated by the imperial troops, and a son of Attila was killed in the battle. Soon after, Leo, in concert with Anthemius, emperor of the West, prepared a numerous fleet, with a large body of troops on board, for the recovery of Africa, which was occupied by the Vandals. Part of the expedition attacked and took the island of Sardinia; the rest landed in Libya, and took Tripolis and other towns; but the delay and mismanagement of the commander, who was Leo's brother-in-law, gave time to Genseric to make his

preparations. Coming out of the harbour of Carthage by night, with fire-ships impelled by a fair wind, he set fire to many of the imperial ships, dispersed the rest, and obliged the expedition to leave the coast of Africa.

Leo gave his daughter Ariadne in marriage to Zeno, an Isaurian, whom he made patrician and captain of his guards, in order to balance the power of Aspar, whose fidelity he had reason to suspect, and whom he afterwards caused to be put to death as a conspirator. The auxiliary Goths rose to avenge Aspar's death, and it was with difficulty that Leo overpowered them. Leo died in January, 474, bequeathing the throne to his grandson Leo, the child of Zeno and Ariadne.

LEO II. was four years of age when he was proclaimed, and the people seemed to approve of the choice; but Ariadne and her mother, the empress Verina, having determined to place Zeno on the throne, induced the child one day, while in public, to place a crown on his father's head and call him his colleague. Young Leo died after a nominal reign of ten months, and Zeno himself was suspected of having procured the death of his own child.

LEO III., called Isauricus from the country of his birth, was of humble parentage, and served in the army under Justinian II. Under the reign of Anastasius II. he received the supreme command of the troops of Asia. After Anastasius was deposed and Theodosius III. proclaimed in his stead in 716, Leo would not acknowledge the latter, but marched to Constantinople, when Theodosius resigned the crown to him in March, 717. The Saracens soon after, coming in large numbers by sea and by land, laid siege to Constantinople, when the new emperor came out of the harbour with some fire-ships, which, being impelled by a fair wind among the enemy's fleet, threw it into confusion and destroyed many of their ships. The severe winter which followed killed most of the horses and camels of the Saracens, and in the course of the next summer Leo, having defeated them by land, obliged them to raise the siege. It was during this long siege that Sergius, governor of Sicily, thinking the empire at an end, made himself independent, but Leo sent a new governor to assert his authority, and the rebels were punished. In 719 Anastasius, having attempted to resume the crown, was beheaded. Thus far Leo had shown himself to be a brave and able sovereign, but unfortunately, like many of his predecessors, he began to mix in religious controversy, which rendered him tyrannical and cruel. The new religion of the Koran abhorred the worship or even the use of images, the Jewish law likewise strictly forbade it as leading to idolatry, and this principle of hostility, thus asserted by both creeds, found its way among the Christians of the East, and was adopted by some zealots, who persuaded Leo, who was a rude uneducated soldier, that the use of images in the churches was contrary to religion. He accordingly issued an edict, ordering their immediate removal. The patriarch of Constantinople and most of the Greek clergy remonstrated against this measure, and the Pope Gregory II. condemned the edict of Leo as heretical. This was the beginning of the schism of the Iconoclasts, or 'image-breakers,' which caused great calamities to the empire, and contributed to its losing Italy, as the Italians, supported by the pontiff, refused to obey the edict, and Leo, who was as obstinate as he was ignorant, resorted to violence, which irritated the people still more. It appears that a conspiracy against the life of the pope was hatched at Rome by the Greek officers there, and supported by the exarch of Ravenna; but the people of Rome rose and killed some of the Greeks, and a general insurrection took place over Italy against the emperor, of which the Longobards availed themselves to extend their dominions, and occupied the port of Classe near Ravenna. Even in the East Leo found the greatest opposition among his subjects, who were much attached to the images. The islands of the Archipelago revolted, and even sent a fleet to threaten the capital, but the Greek fire dispersed it. Great tumults broke out at Constantinople on account of the removal of the images according to the order of the emperor, several persons were killed in the confusion, and others (some women among the rest) were sentenced to death for having excited the mutiny; the patriarch Germanus was deposed, and another prelate favourable to the Iconoclasts was put in his place. Gregory II. having died in 731, his successor Gregory III. assembled a council at Rome in the following year, in which the Iconoclasts were condemned. A messenger who was despatched to the emperor with the decree of the council was detained in Sicily and not allowed to proceed. Leo, in his wrath against the pontiff, detached from the Roman patriarchate the sees of Illyricum, of Calabria and Sicily, and placed them under the patriarch of Constantinople. Meantime the Saracens were making great progress in Asia Minor, and they conquered the whole of Paphlagonia. In the midst of his unsuccessful struggle both against the Saracens of Asia and against the Italians and the pope, Leo died of the dropsy in the year 741, and was succeeded by his son Constantine, called Copronymus, who had married Irene, the daughter of a prince of the Gazari, a Turkish tribe. Constantine was also a furious Iconoclast, and showed himself more cruel and tyrannical than his father.

LEO IV., son of Constantine Copronymus, born at Constantinople in 751, succeeded his father in 775. His disposition was milder than that of his father, but unfortunately he adopted the Iconoclastic tenets with blind fanaticism, and he banished his own wife Irene on this account, and persecuted others. He died in 780, and was succeeded by his son Constantine VI. under the regency of the empress Irene.

LEO V., called the Armenian, because his father was from that country, held a command in the army under the reign of Nicephorus, but being accused of treason, he was confined in a convent. Michael Rangabé, on ascending the throne A. D. 811, gave him his pardon and restored him to his rank. Leo however was too ambitious to be grateful. After obtaining some success against the Saracens, he accompanied Michael on an expedition against the Bulgarians, in which he is charged by the historians with betraying his master, and causing the loss of the battle near Adrianople. Being left by Michael in charge of the remains of the army, he urged them to rebel, and being proclaimed emperor by them, he marched to Constantinople. Michael made no resistance, but sent to his successor the crown, sceptre and other imperial insignia, and retired into a convent. Leo entered the capital in July, 813, and was crowned at St. Sophia's by the patriarch Nicephorus. The Bulgarians having invaded the empire and threatened Constantinople. Leo took the field, defeated them at Mesembria in 814, and in the next year he obliged them to sue for peace. Leo would have been a good prince, had he not meddled in the controversy of the Iconoclasts, and become a persecutor. It appears that the worship of images among the Greeks had degenerated into idolatry, and that such was the fanaticism of the people in favour of their images, that they willingly exposed their lives for them. It is a remarkable fact, that about the same time the abuse of the images attracted the attention of the Western Church. An assembly of Western bishops took place at Paris in the year 824 to examine the subject of the worship of images, to which the opinion of those prelates was not altogether favourable. Leo however, like his Iconoclastic predecessors, went to the other extreme, fancying that the only means of correcting the abuse was by destroying the images altogether: he exiled the patriarch Nicephorus, who would not consent to an Iconoclastic proscription, and he put to death many who were on the same side, which was that of the mass of the people and clergy, and especially the monks, who had great influence in the Eastern empire. Persecution and discontent prepared the way for conspiracies. Michael, surnamed the Stammerer, who had contributed to Leo's elevation, and had been consequently made a patrician, raised his thoughts towards the Empire. He was arrested, convicted of treason, and condemned to death, but his friends, having disguised themselves as priests, introduced themselves into the chapel of the palace, where Leo used to attend matins, and on a given signal, as the emperor began chanting a new psalm, they fell upon him, and killed him in spite of his desperate resistance, A.D. 820. On learning this catastrophe in the place of his exile the patriarch Nicephorus exclaimed, 'The Church is freed from an enemy, but the State has lost an able prince.' Michael the Stammerer succeed to the throne.

LEO VI., styled the Philosopher, probably on account of his writings, for his conduct gave him no claims to the appellation, was the son of the emperor Basilius the Macedonian, whom he succeeded in 886. His brother Alexander was his nominal colleague, but through indolence left the government entirely to Leo. The reign of Leo, which lasted

25 years, was not a prosperous or glorious one for the empire, for while the armies were beaten both by the Saracens and Bulgarians, the capital and the palace were disturbed by the intrigues and excesses of the courtiers, and by the emperor's own irregularities. He again exiled the turbulent Photius, whom his father had reinstated in his see. In the year 904 the Saracens took and plundered Thessalonica, one of the principal cities of the empire, and carried away its inhabitants into slavery. Leo died in 911, at 46 years of age, leaving the crown to his son Constantine Porphyrogennetus, whom he had by his fourth wife Zoe. Although not a deserving sovereign, Leo ought to be remembered as an author; he completed and published the Basilica, or Greek compilation of the laws of the empire, undertaken by his father, and extracted it in great measure from the Justinian body of laws. [BASILICA.] It does not seem to be ascertained, however, whether the work has descended to us as it was completed by Leo, or as it was afterwards reformed by his son Constantine. (Haubold, *Manuale Basilicorum*, Leipzig, 1819; and Heimbach, *De Basilicorum Origine, Fontibus, Scholiis*, &c. Leipzig, 1825.) Leo wrote also a treatise on Tactics, which has been published by Meursius; and a collection of Oracles or Prophecies (for he laid claim to an insight into futurity), which has also been published; a poem on the calamities of Greece, other verses, moral Orations, &c., are yet inedited.

LEO I. was only a deacon when he was chosen by the clergy and people of Rome to be their bishop, after the death of Sixtus III., A.D. 440, under the reign of Valentinianus III., emperor of the West, and Theodosius II., emperor of the East. He was a man of learning, and well acquainted with the world and with state affairs, having been employed on several missions by the imperial court. In his youth he had been acquainted with St. Augustine, and had profited by his instruction and example. Soon after his exaltation he had a controversy with Hilarius, bishop of Arelate (Arles) in Gaul, who had deposed Celidonius, bishop of Vesontio (Besançon), because he had married a widow, which was forbidden by the canons. Celidonius however appealed to Leo, who reinstated him in his see. Hilarius was summoned to Rome upon several charges brought against him by other bishops of Gaul, to whom his severity was obnoxious; and Leo obtained a rescript from the emperor Valentinian III., suspending Hilarius from his episcopal office. This suspension however does not appear to have been lasting, although the fact has been taken hold of by controversial writers as a stretch of jurisdiction in the see of Rome. Quesnel published a dissertation upon this controversy in his edition of the works of Leo, Paris, 1675. Leo also induced the emperor to issue, in the year 445, several laws against the Manichæans and other heretics, depriving them of the rights of citizenship and of inheritance, and excluding them from the military service. He assembled a council at Rome in 449, in which he annulled the acts of the council of Ephesus, which had absolved Eutyches. [EUTYCHIANS.] Soon afterwards the Œcumenic council of Chalcedon, A.D. 451, in which Leo's legates presided, condemned the doctrine of Eutyches, and defined the doctrine concerning the person of Christ. By a canon of this council, which was Œcumenic, or universal, both for the East and West, the bishop of Constantinople was declared to be next in place, though equal in dignity, to the bishop of Rome, and the limits of their respective jurisdictions were determined, the patriarchates of Antioch and Alexandria being placed under that of Constantinople; which canon passed the assembly, notwithstanding the opposition of the Roman legates. The story of Leo stopping Attila on his march, and persuading him to spare the city of Rome, is an embellishment; but it appears that Leo was really sent by Valentinian on a mission to Attila, who was then devastating Lombardy, and that Attila consented to a truce with Valentinian, after which he recrossed the Alps. Some years after, Leo did prevail upon Genseric, who had landed at the mouth of the Tiber, A.D. 455, to spare at least the lives and the buildings in Rome, and not to allow his Vandals to set fire to that city or slaughter the inhabitants. Genseric was satisfied with the plunder of Rome, and returned to Africa. Leo died in 461, and was succeeded by Hilarius I. His writings, especially his Sermons and his Epistles, are useful for the history of the times. Quesnel has given a full account of his life, as well as Maimbourg, 'Histoire du Pontificat de St. Léon le Grand.' Father Cacciari published an edition of Leo's works, 3 vols. fol., Rome, 1751-5, in which he has charged Quesnel's edition with great incorrectness. Leo's Sermons have been translated into French by the Abbé de Bellegarde, Paris, 1701. The Roman Church numbers him among its saints, and gives him also the epithet of Magnus, or 'St. Leo the Great.'

LEO II., a native of Sicily, succeeded Agathon in the see of Rome, A.D. 682. He put an end to the schism between the see of Ravenna and that of Rome, it being agreed that the bishops of Ravenna should receive their ordination at Rome, but that they should be exempted from the payment of money which had been exacted from them on receiving the pallium. Leo died in the year 683, and was succeeded, after a vacancy of nearly one year, by Benedict II.

LEO III., a native of Rome, was elected after the death of Adrian I., A.D. 795. He immediately communicated his election to Charlemagne, to whom he, like his predecessor, acknowledged allegiance. Charlemagne replied by a letter of congratulation, which he entrusted to the abbot Angilbertus, whom he commissioned to confer with the new pontiff respecting the relations between the see of Rome and the 'Patrician of the Romans,' for this was the title which Charlemagne had assumed. In 796 Leo sent to Charlemagne the keys of St. Peter and the standard of the city of Rome, requesting the king to send some of his nobles to administer the oath of allegiance to the people of Rome. The dominion of Charlemagne over the city and duchy of Rome is attested by Paulus Diaconus, who says that 'Charles added to his other sceptres that of the city of Romulus.' In the year 799, an atrocious assault, the motive of which is not clearly ascertained, was committed on the person of the pope. While Leo was riding on horseback, followed by the clergy, and chanting the liturgy, a canon of the name of Paschal and a sacristan called Campulus, accompanied by many armed ruffians, fell upon him, threw him down from his horse, and dragged him into the convent of St. Sylvester, when they stabbed him in many places, endeavouring to pull out his eyes and cut out his tongue. In this however it seems that they did not succeed, as Leo was delivered by his friends from the hands of the assassins, and taken to Spoleti under the protection of that duke, where he soon after recovered, and was enabled to travel as far as Paderborn in Germany, where Charlemagne then was, by whom the pope was received with the greatest honours. Charlemagne sent him back to Rome, with a numerous escort of bishops and counts, and also of armed men. The pope was met outside of the city gates by the clergy, senate, and people, and accompanied in triumph to the Lateran palace. A court, composed of the bishops and counts, proceeded to the trial of the conspirators who had attempted the life of the pope; and the two chiefs, Paschal and Campulus, were exiled to France. From this very lenient sentence, and other concomitant circumstances, it appears that Charlemagne had greatly at heart to conciliate the Romans in general, in order to deter them from betaking themselves again to the protection of the Greek emperors.

In the year 800 Charlemagne himself came to Italy, and was met at Nomentum, outside of Rome, by the pope; and the next day he repaired to the Basilica of the Vatican, escorted by the soldiers and the people. After a few days Charlemagne convoked a numerous assembly of prelates, abbots, and other persons of distinction, Franks as well as Romans, to examine certain charges brought against the pope by the partisans of Paschal and Campulus; but no proofs were elicited, and Leo himself, taking the book of gospels in his hand, declared himself innocent. On Christmas-day of that year the pontiff officiated in the Basilica of the Vatican, in presence of Charlemagne and his numerous retinue. As Charlemagne was preparing to leave the church, the pontiff stopped him, and placed a rich crown upon his head; while the clergy and the people, at the same moment, cried out, 'Carolo piissimo,' 'Augusto magno imperatori,' and other expressions and acclamations which were used in proclaiming the former Roman emperors. Three times the acclamations were repeated, after which the pope was the first to pay homage to the new emperor. From that time Charlemagne left off the titles of king and patrician, and styled himself Augustus and Emperor of the Romans; and he addressed the emperor of Constantinople by the name of brother.

Thus was the Western empire revived, 325 years after Odoacer had deposed Romulus Augustulus, the last nominal successor of the Cæsars on the throne of the West. From that time all claim of the Eastern emperors to the supreme dominion over the duchy of Rome was at an end; and the popes from the same time assumed the temporal authority over the city and duchy, in subordination however to Charlemagne and his successors; they began also to coin money, with the pontiff's name on one side and that of the emperor on the other.

In the year 804 the pope went to pass the Christmas at the court of Charlemagne at Aquisgrana (Aix-la-Chapelle), after which he returned to Italy. In the division which Charlemagne made by will of his dominions among his sons, the city of Rome was declared to belong to him who should bear the title of emperor. Louis le Debonnaire was afterwards invested with that title by Charlemagne himself, and we find him accordingly, after the death of his father, assuming the supreme jurisdiction over that city on the occasion of a fresh conspiracy which broke out against Leo, the heads of which were convicted by the ordinary courts at Rome, and put to death. Louis found fault with the rigour of the sentence and the haste of its execution, and he ordered his nephew Bernard, king of Italy, to proceed to Rome and investigate the whole affair. Leo, who seems to have been alarmed at this proceeding, sent messengers to the court of Louis to justify himself. Meantime he fell seriously ill, and the people of Rome broke out into insurrection, and pulled down some buildings he had begun to construct on the confiscated property of the conspirators. The Duke of Spoleti was sent for with a body of troops to suppress the tumult. Leo died in 816, and Stephen IV. was elected in his place. Leo is praised by Anastasius, a biographer of the same century, for the many structures, especially churches, which he raised or repaired, and the valuable gifts with which he enriched them. In his temporal policy he appears to have been more moderate and prudent than his predecessor, Adrian I., who was perpetually soliciting Charlemagne in his letters for fresh grants of territory to his see.

LEO IV. succeeded Sergius II. in 847. He was consecrated without waiting for the consent of the emperor Lotharius, because of the urgency of the circumstances. Rome was then threatened by the Saracens, who occupied part of the duchy of Benevento, and who a short time before had landed on the banks of the Tiber, and plundered the Basilica of St. Peter's on the Vatican, which was outside of the walls. In order to prevent a recurrence of this violence, Leo undertook to surround the Basilica and the suburb around it with walls, and this being completed in four years, with the assistance of money sent by the emperor, and the produce of a tax levied upon all property in the duchy of Rome, the new town was called Leonina, a name which it has retained to this day. Leo also restored the town of Porto on the Tiber, near its mouth, settling there some thousands of Corsicans, who had run away from their country on account of the Saracens. Towers were built on both banks of the river, and iron chains drawn across to prevent the vessels of the Saracens from ascending to Rome. The port and town of Centum Cellæ being forsaken on account of the Saracens, Leo built a new town on the coast, about 12 miles distant from the other, which was called Leopolis, but no traces of it remain now, as the modern Civitavecchia is built on or near the site of old Centum Cellæ. Leo died in July, 855, and, fifteen days after his death, Benedict III. was elected in his place, according to the most authentic text of Anastasius, who was a contemporary. But later writers introduced between Leo IV. and Benedict III. the fable of Pope Joan. [JOAN, POPE.]

LEO V., a Benedictine monk, succeeded Benedict IV., A.D. 903. In less than two months he was violently superseded and imprisoned by a certain Christopher, who was his chaplain, and who assumed the pontifical office. But Christopher himself did not retain it long, as a new revolt of the Romans drove him from the usurped see, and put in his place Sergius III., who was the favourite of the celebrated Marozia, a powerful but licentious woman, who disposed of everything in Rome. The tenth century is the darkest æra of the papacy. How the unfortunate Leo died is not mentioned; probably he died in prison.

LEO VI. succeeded John X., A.D. 928, and died seven months afterwards; some say that he was put to death by Marozia, like his predecessor. He was succeeded by Stephen VII.

LEO VII. succeeded John XI., the son of Marozia, A.D. 937. He mediated a peace between Alberic, duke of Rome, and Hugo, king of Italy, who had offered to marry Marozia, in order to obtain by her means the possession of Rome, but was driven away by Alberic, Marozia's son. Leo is said to have been a man of irreproachable conduct, but little else is known of him. He died in the year 939, and was succeeded by Stephen VIII.

LEO VIII. succeeded John XII., who was deposed for his misconduct, by a council assembled at Rome, in presence of the emperor Otho I., A.D. 963. But soon after Otho had left Rome, John XII. came in again at the head of his partisans, obliged Leo to run away, and resumed the papal office. John however died shortly after, and the Romans elected Benedict called V. Otho, returning with an army, took the city of Rome, exiled Benedict, and reinstated Leo, who died about 965, and was succeeded by John XIII.

LEO IX., Bruno, bishop of Toul, was appointed in 1049 to succeed Damasus II. at the joint recommendation of the emperor Henry III. and of the famous Hildebrand (afterwards Gregory VII.). He was continually in motion between Germany and Italy, holding councils and endeavouring to reform the discipline and morals of the clergy, and also to check the progress of the Normans in Southern Italy, against whom he led an army, but was defeated in Apulia and taken prisoner by the Normans, who treated him with great respect, but kept him for more than a year in Benevento. Having made peace with them by granting to them as a fief of the Roman see their conquests in Apulia and Calabria, he was allowed to return to Rome, where he died in 1054, and was succeeded by Victor II.

LEO X., Giovanni de' Medici, the second son of Lorenzo the Magnificent, was born in December, 1475. He was made a cardinal at the unusually early age of thirteen, by Pope Innocent VIII., who was very intimate with his father Lorenzo. After the death of Lorenzo in 1492, Cardinal de' Medici shared in the expulsion of his brothers, Piero and Giuliano, from Florence, in November, 1494. [MEDICI.] After fruitless endeavours to effect their restoration, Cardinal de' Medici gave up the attempt, and quitted Italy, which country was then ravaged by foreign arms, and betrayed by the wretched policy of Alexander VI. Cardinal de' Medici travelled through Germany and France, courting the acquaintance of men of learning, and displaying his own taste for literature and the liberal arts. After the death of Alexander VI., in 1503, he returned to Rome, where Julius II. employed him as legate with the army against the French. Being taken prisoner by the latter at the battle of Ravenna, in April, 1512, he was sent to Milan, but soon after effected his escape. The French being driven out of Lombardy, and the Florentine republic, with the Gonfaloniere Soderini at its head, being charged with partiality towards the foreigners, Cardinal de' Medici contrived to employ the arms of the allied powers in replacing him and his family in their former supremacy over their native country. A body of 5000 Spaniards, brave to ferocity, were marched under Raymond de Cardona against Florence, in August, 1512. On their way they stormed the town of Prato, and massacred the citizens, which so intimidated the Florentines that they immediately capitulated; and Cardinal de' Medici and his brother Giuliano soon after entered Florence, and forced the Signoria, or executive, to call a 'parlamento,' or general assembly of the people, in the great square, on the 16th December. This general assembly of the sovereign people had repeatedly been used by ambitious men as a ready instrument of their views, and it proved such on this occasion. [FLORENCE, *History*.] All the laws enacted since the expulsion of the Medici in 1494 were abrogated. A balia, or commission, was appointed, consisting of creatures of that family, with dictatorial powers to reform the state. No bloodshed however accompanied the re-action; but Soderini and other citizens opposed to the Medici were banished. Soon after, in March, 1513, news came of the death of Julius II. at Rome, and Cardinal de' Medici hastened to the conclave, leaving his brother Giuliano and his nephew Lorenzo, son of Piero, at the head of the affairs of Florence.

Cardinal de' Medici was elected pope, in March, 1513, at the early age of thirty-seven, when he assumed the name of Leo X. One of his first acts was to appoint two

men of learning, Bembo and Sadoleto, for his secretaries. He next sent a general amnesty to be published at Florence, where a conspiracy had been discovered against the Medici, for which two individuals were executed; and others, with the celebrated Machiavelli among the rest, were arrested and put to the torture. Leo ordered Giuliano to release the prisoners, and recall those that were banished, and Soderini among the rest. Giuliano being invited to Rome, where he was made Gonfaloniere of the Holy Church, Leo appointed his nephew Lorenzo governor of Florence, and his cousin, Cardinal Giulio de' Medici, archbishop of the same. Florence was now a dependency of Rome, and such it continued during the rest of Leo's life.

The pontificate of Leo X., though it lasted only nine years, forms one of the most memorable epochs in the history of modern Europe, whether we consider it in a political light as a period of transition for Italy, when the power of Charles V. of Spain began to establish itself in that country; or whether we look upon it as that period in the history of the Western Church which was marked by the momentous event of Luther's Reformation. But there is a third and a more favourable aspect under which the reign of Leo ought to be viewed, as a flourishing epoch for learning and the arts, which were encouraged by that pontiff, as they had been by his father, and indeed as they have been by his family in general, and for which the glorious appellation of the age of Leo X. has been given to the first part of the sixteenth century.

Leo found the war renewed in Northern Italy. Louis XII. sent a fresh army, under La Trimouille, to invade the duchy of Milan. The Swiss auxiliaries of Duke Maximilian Sforza defeated La Trimouille at Novara, and the French were driven out of Italy. The Venetians however had allied themselves with Lous XII., and Leo sent Bembo to Venice to endeavour to break the alliance. Differences broke out between Leo and Alfonso d'Este, duke of Ferrara, who demanded the restoration of Reggio, taken from him by Julius II., which Leo promised, but never performed; on the contrary, he purchased Modena of the emperor Maximilian, disregarding the rights of the house of Este to that town. The pope held likewise Parma and Piacenza, and it appears that he intended to form out of these a territory for his brother Giuliano, and he made attempts to surprise Ferrara also with the same view. His predecessor, Julius, had in view the independence of all Italy, and he boldly led on the league for this purpose; Leo had a narrower object,—his own aggrandizement and that of his family,—and he pursued it with a more cautious and crooked policy.

Leo re-opened the council of the Lateran, which had begun under Julius II., for the extinction of the schism produced by the council of Pisa, which had been convoked by Louis XII., in order to check the power of that pope, who was his enemy. Circumstances were now changed, and Louis XII. made his peace with Leo in 1514, renounced the council of Pisa, and acknowledged that of the Lateran. Louis XII. died in the following year, and his successor Francis I., among his other titles, assumed that of Duke of Milan, which was the signal of a new Italian war. The Venetians joined him, whilst the emperor Maximilian, Ferdinand of Spain, Duke Sforza, and the Swiss made a league to oppose the French. The Pope did not openly join the league, but he negotiated with the Swiss by means of the cardinal of Sion, and paid them considerable sums to induce them to defend the north of Italy. The Swiss were posted near Susa, but Francis, led by old Trivulzio, passed the Alps by the Col de l'Argentier, entered the plains of Saluzzo, and marched upon Pavia, whilst the Swiss hastened back to defend Milan. The battle of Marignano was fought on 14th September, 1515. The Swiss made desperate efforts, and would probably have succeeded, had not Alviano with part of the Venetian troops appeared suddenly with cries of 'Viva San Marco,' which dispirited the Swiss, who believed that the whole Venetian army was coming to the assistance of the French. The result was the retreat of the Swiss, and the entrance of the French into Milan, who took possession of the Duchy. Leo now made proposals of alliance to Francis, who eagerly listened to them, and they had a conference at Bologna in December, 1515, in which a concordat was agreed upon, regulating the appointment to the sees and livings in the French kingdom, which concordat remained in force till the French revolution. A marriage was also agreed upon between Lorenzo, the pope's nephew, and Madeleine de Boulogne, niece of Francis de Bourbon, duke of Vendôme, from which marriage Catherine de' Medici, afterwards Queen of France, was born.

In 1516, Leo, under some frivolous pretences, deprived Della Rovere, the nephew of Julius II., of his duchy of Urbino, Pesaro, and Sinigaglia, which he gave to his nephew Lorenzo de' Medici. Soon afterwards a conspiracy to murder the Pope was discovered at Rome, and cardinal Petrucci, who was at the head of it, was hanged. In 1517 the council of the Lateran was finally closed, and in the same year Leo authorized the sale of indulgences in Germany, which was the immediate cause of the Reformation. [LUTHER.] For some years after however, Leo took little notice of the progress of Luther's opinions in Germany; and indeed to the end of his life Leo's mind appears to have been much more concerned with what occurred around him in Italy, than with the remote controversy carried on in Saxony, the consequences of which he probably did not foresee.

In 1518 a league of five years was proclaimed by Leo among the Christian princes, to oppose the advance of the Turks, who were threatening Italy. For this purpose the Pope gave to the Christian princes the disposal of part of the revenues of the clergy, which they readily appropriated to themselves, without doing anything against the Turks.

Gian Paolo Baglione of Perugia, a celebrated condottiero, had seized upon the government of his native town. Leo cited him to appear at Rome, with promises however of safety for his person. Upon his arrival Baglione was arrested, put to the torture, made to confess many crimes, and at last beheaded. Perugia was then annexed to the Papal State, as well as the duchy of Urbino after the death of Lorenzo de' Medici, who left no male issue.

The alliance of Leo with Francis I. was a hollow one, each party mistrusting the other. At last Leo, thinking that an alliance with the young monarch of Spain and emperor of Germany was likely to be much more advantageous to him, concluded a secret treaty, offensive and defensive, with Charles V., on the 8th of July, 1521, by which it was stipulated that the duchy of Milan was to be taken from the French and given to Francesco Maria Sforza, and Parma and Piacenza to be restored to the Pope. Leo subsidized a body of Swiss, and Prospero Colonna with the Spaniards from Naples joined the Papal forces at Bologna, crossed the Po at Casalmaggiore, joined the Swiss, and drove the French governor Lautrec out of Milan. In a short time the duchy of Milan was once more clear of the French, and restored to the dominion of Sforza. Parma and Piacenza were again occupied by the Papal troops. Leo at the same time declared Alfonso d'Este a rebel to the Holy See for having sided with the French, whilst the Duke on his part complained of the bad faith of the Pope in keeping possession of Modena and Reggio. The news of the taking of Milan was celebrated at Rome with public rejoicings, but in the midst of all this Leo fell ill, on the 25th of November, and died on the 1st of December, 1521, being 46 years of age, not without suspicion of poison, though some have maintained that he died a natural death.

Leo was generous, or rather prodigal; he was fond of splendour, luxury, and magnificence, and therefore often in want of money, which he was obliged to raise by means not always creditable. He had a discerning taste, was a ready patron of real merit, was fond of wit and humour, not always refined, and which at times degenerated into buffoonery. This was indeed one of his principal faults. His state policy was like that of his contemporaries in general, and not so bad as that of some of them. He contrived however to keep Rome and the Papal territory, as well as Florence, in profound peace during his nine years' pontificate, no trifling boon, whilst all the north of Italy was ravaged by French and Germans and Spaniards, who committed all kinds of atrocities. He was by no means neglectful of business, although he was fond of conviviality and ease, but even his enemies have not substantiated any charge against his morals. He did not, and perhaps could not, enforce a strict discipline among the clergy or the people of Rome, where profligacy and licentiousness had reigned almost uncontrolled ever since the pontificate of Alexander VI.

The services which Leo rendered to literature are many He encouraged the study of Greek, founded a Greek col lege at Rome, established a Greek press, and gave the di

rection of it to John Lascaris; he restored the Roman University and filled its numerous chairs with professors; he directed the collecting of MSS. of the classics, and also of Oriental writers, as well as the searching after antiquities; and by his example encouraged others, and among them the wealthy merchant Chigi, to do the same. He patronized men of talent, of whom a galaxy gathered round him at Rome. He employed Michel Angelo at Florence and Raphael at Rome in the Vatican. He corresponded with Erasmus, Machiavelli, Ariosto, and other great men of his time. He restored the celebrated library of his family, which on the expulsion of the Medici had been plundered and dispersed, and which is now known by the name of the Biblioteca Laurenziana at Florence. In short Leo X., if not the most exemplary among popes, was certainly one of the most illustrious and meritorious of the Italian princes.

(Guicciardini, *Storia d'Italia;* Roscoe's *Life and Pontificate of Leo X.;* the same in Italian, translated by Bossi, with numerous and valuable notes and additions. For the *bulls* and *speeches* of Pope Leo X. see Fabricius, 'Bibliotheca Latina Mediæ et Infimæ Ætatis.')

LEO XI., Cardinal Alessandro de' Medici, had been sent by his predecessor, Clement VIII., legate to France, to receive Henri IV. into the bosom of the Catholic church. He was very old when elected, on the 1st of April, 1605, and he died on the 27th of the same month, it is said from the fatigue attending the ceremony of taking possession of the Patriarchal church of St. John in Laterano.

LEO XII., Cardinal Annibale della Genga, born in 1760, of a noble family of the Romagna, was employed as nuncio to Germany and France, by Pius VII., who made him a cardinal in 1816. On the death of Pius VII. he was elected pope, in September, 1823. He was well acquainted with diplomacy and foreign politics, and in the exercise of his authority, and in asserting the claims of his see, he assumed a more imperious tone than his meek and benevolent predecessor. He re-established the right of asylum for criminals in the churches, and enforced the strict observance of meagre days. He was a declared enemy of the Carbonari and other secret societies. He proclaimed a jubilee for the year 1825; and in his circular letter accompanying the bull, addressed to the patriarchs, primates, archbishops, and bishops, he made a violent attack on the Bible Societies, as acting in opposition to the decree of the Council of Trent, session iv., concerning the publication and use of the Sacred Books. Leo also entered into negotiations with the new states of South America, for the sake of filling up the vacant sees. He gave a new organization to the university of the Sapienza at Rome, which consists of five colleges or faculties, namely, theology, law, medicine, philosophy, and philology; and he increased the number of the professors, and raised their emoluments. He published, in October, 1824, a Moto Proprio, or decree, reforming the administration of the Papal State, and also the administration of justice, or Procedura Civile, and he fixed the fees to be paid by the litigant parties. He corrected several abuses, and studied to maintain order and a good police in his territories. He died in February, 1829, and was succeeded by Pius VIII.

LEO, JOHN, was a Moor of Granada, who, retiring into Africa, when his native place was taken in 1492, received the surname of AFRICANUS. After travelling a considerable time in Europe, Asia, and Africa, he was taken at sea by pirates, and subsequently abjured the Mohammedan religion under Pope Leo X. He is believed to have died about 1526. His 'Description of Africa' was first written in Arabic, and afterwards translated by its author into Italian. It was translated into Latin by John Florian, 8vo. Antw., 1556; 24mo., Lugd. Bat., Elzev., 1632; and into French by Jean Temporal, 2 tom. fol., Lyon, 1556. Marmol the Spaniard appropriated to himself the greater part of the text of this work without acknowledging it. Leo Africanus wrote also the 'Lives of the Arabian Philosophers,' printed by Hottinger, in Latin, at Zürich, fol., 1664; they were again published, from a different manuscript, in the 13th volume of Fabricius's 'Bibliotheca.' (Moreri's *Dict.;* Chalmers's *Biogr. Dict.*, vol. xx.)

LEO, LEONARDO, a celebrated composer, who flourished during the early half of the last century, was born at Naples in 1694, and received his musical education under Alessandro Scarlatti, having for his fellow-disciples Durante, Vinci, Porpora, &c. He soon distinguished himself by his Italian operas, which gained for him a high reputation, and are mentioned by musical critics in strong terms of praise. But how fleeting was the fame arising from such compositions till Mozart appeared, and gave them immortal life! Out of the many produced by Leo not one survives; and had he not dedicated a portion of his time to the church, his name would now have been utterly forgotten. His *Dixit Dominus*, his *Miserere*, masses, and other sacred music, will always be esteemed for the grandeur of their style, their deep feeling, the sensible manner in which the words are set, and for greatness of effect produced by comparatively simple means. He will be remembered too in musical history as the master of Piccini, Jomelli, and other able composers. He died at Naples, in 1755.

LEO ALLA'TIUS. [ALLATIUS.]

LEO (the Lion), a constellation of the ZODIAC, which commemorates the Nemæan lion killed by Hercules in the mythology of the Greeks. It is surrounded by Ursa Major, Leo Minor, Cancer, Hydra, Sextans, Virgo, and Coma Berenices. A line drawn through the pole star and the lowest of the four in the Great Bear (or γ) passes through Deneb (or β Leonis); and a line drawn through the bright star Regulus (or α Leonis) of the first magnitude and Deneb passes nearly through Arcturus. The principal stars are as follows:—

Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.	Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.
	Flamsteed. (Piazzi.) [Bradley.]	Astron. Society.			Flamsteed. (Piazzi.) [Bradley.]	Astron. Society.	
κ	1	1140	5	b	60	1306	5
ω	2	1149	6	p^1	61	1304	5
·	3	1150	6	p^2	62	1309	6
λ	4	1153	4	χ	63	1310	4½
ξ	5	1154	5½	p^3	65	1313	6
h	6	1155	6	p^4	66	1317	6
	7	1162	6		67	1314	6
	8	1163	6	δ	68	1320	2½
	9	1164	6	p^5	69	1321	5½
	10	1165	5	θ	70	1323	3
	11	1166	6	(t)	72	1324	5
	13	1170	6	n	73	1325	6
o	14	1171	3½	φ	74	1327	4
ψ	16	1174	6	(q)	75	1328	6
ε	17	1175	3		76	1332	6
	18	1177	6	σ	77	1334	4½
	19	1178	7	ι	78	1338	4
	20	1180	6	(r)	79	1339	5½
g	22	1184	6		80	1345	6
μ	24	1187	3½		81	1343	6
ν	27	1193	5½		82	1344	7½
π	29	1197	4	τ	84	1347	4
η	30	1206	3½		85	1349	6
A	31	1207	5		86	1351	6
α	32	1209	1	e	87	1352	4½
	34	1214	7	(H)	89	1357	6
ζ	36	1221	3	(C)	90	1358	6
	37	1222	6	υ	91	1362	4
	40	1227	6		92	1366	6
γ	41	1228	2	(E)	93	1373	4
	42	1232	6	β	94	1375	1½
z	43	1233	6		(4)	1318	7
b^1	44	1237	5½		(10)	1217	7
	45	1242	6		(12)	1322	6½
i	46	1252	6		(22)	1326	6
ρ	47	1254	4		(23)	1220	6
	48	1256	6		(35)	1128	7
	49	1259	6		(50)	1336	7
	50	1263	6½		(60)	1341	6½
m	51	1278	6		(74)	1143	7
k	52	1279	6		(77)	1348	7
l	53	1284	6		(158)	1173	7
	54	1293	4½		(225)	1308	7
u	55	1295	5½		(230)	1198	6½
	56	1296	6½		(237)	1200	7
	57	1298	6		(240)	1202	7
d	58	1302	5½		[1313]	1132	7
c	59	1303	5		[1321]	1141	7

LEO MINOR, a constellation of Hevelius, surrounded by Ursa Major, Lynx, Cancer, and Leo. Its principal stars are as follows:—

Character.	No. in Catalogue of		Magnitude.
	Flamsteed.	Astron. Society.	
b	10	1158	4½
d	21	1204	5
f	30	1236	4¾
g	31	1240	5
l	37	1261	5¼
	40	1269	6
m	41	1271	5
n	42	1274	4½
	44	1285	6
o	46	1289	4½
	50	1297	6

LEO'DICE (Zoology), a name given by Savigny to a genus of *Dorsibranchiata, Eunice* of Cuvier. [DORSIBRANCHIATA.]

LEOMINSTER. [HEREFORDSHIRE.]

LEO'N, REYNO DE, one of the former great divisions of Spain, originating in the political formation of that country into different kingdoms, which grew out of the successive conquests of the Christians from the Moors. The kingdom of Leon was the earliest of these, and was formed by the Christians coming out of the fastnesses of Asturias and extending their conquests southwards to the Duero. The immediate successors of Pelayo were called kings of Oviedo or of Asturias, because that province was then the only part free from the Moors, and had never been conquered by them. Alfonso, called the Catholic, A.D. 739 to 757, conquered the towns of Leon, Astorga, Simancas, Zamora, Salamanca, and Ledesma, as well as part of Galicia. These were added to the dominions of the Asturian kings, though held on the precarious tenure of either paying tribute to the neighbouring Moors, or having to defend them against their incursions. It was Garcia, son and successor of Alfonso III., who, about A.D. 910, transferred the seat of sovereignty from Oviedo to Leon. Henceforth the Christian kingdom in Northern Spain was called the kingdom of Leon and Asturias, and was independent of the kingdom of Navarra, which was on the other side of the Ebro. The counts of Castilla, who had formed another Christian state between the two, were for a time dependent, nominally at least, on the kings of Leon, until A.D. 1025, when Castilla became an independent kingdom under a branch of the royal house of Navarra. The boundaries of all these kingdoms were of course not clearly or fixedly determined. Almost always at war, either with the Moors or among themselves, the extent of their respective territories varied with every reign, or rather with every fresh campaign. The male line of the kings of Leon became extinct with Bermudo III. in the year 1037, whose sister had married Fernando, king of Castile, who thus united both crowns. But at his death Sancho, one of his sons, had Castile, and Alfonso had Leon and Asturias. The two kingdoms remained distinct, although their crowns were sometimes worn by the same person, for nearly two centuries, until Fernando III., in 1230, permanently united the two kingdoms, assuming the title of king of Leon and Castilla, which his successors retained.

The territory known by the name of the kingdom of Leon comprised six provinces, namely, LEON, properly so called; PALENCIA; TORO; ZAMORA; SALAMANCA; and VALLADOLID. They are all comprised in the basin of the Duero, between the Asturian mountains on the north, the Sierra de Gata and Sierra de Gredos to the south, which divide the basin of the Duero from that of the Tagus, or province of Estremadura, and between the boundaries of Burgos and Segovia in Old Castile on the east, and the frontiers of Portugal and Galicia on the west. The whole extent of the kingdom of Leon is roughly calculated at 21,000 square miles, and its population at 1,215,000 inhabitants. The name and antient boundaries of the kingdom of Leon are now a mere historical remembrance: all Spain being at present divided into provinces, the old division by kingdoms has become obliterated.

LEO'N, THE PROVINCE OF, is bounded north by the Asturias, south by the province of Zamora, east by that of Palencia, and west by Galicia. It is nearly 100 miles in length from east to west, and about 50 wide from north to south, and its population is reckoned at 311,700 inhabitants. The province belongs mainly to the basin of the Duero, being crossed from north to south by the Esla, which rises in the mountains of Valdeburon, on the borders of Asturias, and flows southwards into the province of Zamora, where it enters the Duero. The Esla is joined in its course by many streams, both from the east and the west. There is a small part of the province of Leon, west of Astorga, which forms part of the basin of the Miño, being watered by the Sil and other tributaries of that river. An offset of the Asturian chain, which runs southward to the west of Astorga, forms the limit between the two river-basins. The surface of Leon is mountainous in the north of the province where it rises towards the Asturian chain, but it slopes to the south, where it sinks into the plain of the Duero. The country produces corn, though not sufficient for the consumption; fruit and vegetables in abundance, and hemp, flax, and wine, which however is not so good as the wine of Toro and Rueda. Large herds of cattle and flocks of sheep, as well as horses and mules, are reared in this province. There are few manufactories; coarse woollen cloths are made near Astorga, and much flax is spun by the distaff and bleached, and forms an article of export. The country people of Leon are very simple in their manners, and deficient in comforts and refinement; there are few proprietors among them, most of them being tenants or labourers of the estates of the nobility and corporations.

The two principal towns of the province are:—1. Leon (Legio Septima), an old and now somewhat decayed city, said to have been built by the Roman soldiers of the 7th legion, in the time of Vespasian; it was for more than two centuries the residence of the kings of Christian Spain. Its cathedral, built in the thirteenth century, is one of the finest in Spain, and contains the tombs of the old kings. There are two other collegiate churches, San Marco and San Ysidro. The Plaza Mayor, or principal square, is handsome, and there are other squares adorned with fountains. Leon contains about 6000 inhabitants. 2. ASTORGA. The other towns of the province are Sahagun, with a celebrated Benedictine convent; Ponferrada; Villafranca, on the high road to Galicia; Benavides, &c.

LEONARD, ST. [VIENNE, HAUTE.]

LEONARDO of PISA, or LEONARDO BONACCI, an Italian mathematician who lived at the commencement of the thirteenth century, was the first person who brought to Europe the knowledge of algebra. His work was never printed, but is preserved at Rome, and is described in Cossali's 'History of Algebra.' From Italy the knowledge of algebra was long afterwards communicated to the rest of Europe. He was author of a treatise preserved in the Maghabecchi library at Florence, entitled 'Practica Geographia.'

LEO'NIDAS, King of Sparta, commanded the Grecian troops sent to maintain the pass of Thermopylæ against the invading army of the Persians under Xerxes, B.C. 480. The force under his command amounted to 4200 men, besides the Opuntian Locri and a thousand Phocians. With these, during two days' fight, he defended the narrow defile which was the usual passage from Thessaly to the southern parts of Greece; and probably he would have frustrated the utmost efforts of the invader but for the discovery, by some renegades, of a circuitous and unfrequented pass by which a body of the invaders crossed Mount Œta. On receiving intelligence that his position was thus turned, Leonidas dismissed all his soldiers except 300 Spartans; the Thebans, whose fidelity to the common cause was suspected; and the Thespians, 700 in number, who resolved to share the fate and the glory of the Spartans,—for the laws of Sparta forbade her citizens to turn their backs upon any odds; and in this great emergency, when many states seemed inclined to yield to Persia, Leonidas probably thought that the effect to be produced by a great example of self-devotion and obedience was of more importance to the cause of Greece than the preservation of a

certain number of her best soldiers. Being surrounded and attacked in front and rear, the Spartans and Thespians fell to a man after making vast slaughter: the Thebans asked and received quarter. The corpse of Leonidas was mutilated and exposed on a cross by Xerxes. A stone lion was afterwards raised near the spot where he fell. The slain were buried where they fell, and their memory was honoured by monumental pillars. Two of the inscriptions ran thus:—'Here 4000 men from Peloponnesus once fought three millions:' 'Stranger, tell the Lacedæmonians that we lie here, obeying their laws.' This self-devotion of Leonidas, the beginning of the grandest war related in history, has ever been held to be among the noblest recorded instances of heroism and patriotism.

We have followed the account of Herodotus (vii., 202, &c.). Diodorus and Plutarch relate it somewhat differently.

LEONINE VERSES, a kind of measure much in fashion during the middle ages. It consists properly of the Latin hexameter, or hexameter and pentameter rhymed. No less than ten varieties in the fall of the rhymes are counted; but that which is by far the most common is when the cæsura on the fifth syllable rhymes with the end of the line, as for example:

'En Rex Edvardus, debacchans ut Leopardus.'

There is an example of a modern attempt at Leonine verses in Parnell's translation of a passage in the 'Rape of the Lock,' beginning,

'Et nunc dilectum speculum pro more retectum.'

The rhymes appear universally to be dissyllabic. The classical metre is however not essential. We find in the antient hymns of the Roman Catholic Church the rhythm of modern versification:—

'Quid sum miser tunc dicturus,
Quem patronum rogaturus,
Cum vix justus sit securus?'

Or in the famous song of Walter de Mapes, archdeacon of Oxford in the time of Henry II.:

'Mihi est propositum in taberna mori,
Vinum sit appositum morientis ori,
Ut dicant, cum venerint Angelorum chori,
Deus sit propitius huic potatori.'

The term is said to be derived from Leoninus, a monk of the twelfth century, the reputed inventor of this mode of composition, which however is shown to go back as far at least as the third. It went out of fashion with the revival of classical learning. For more particulars see Sir A. Croke, 'Essay on the Origin, Progress, and Decline of Latin Verse,' quoted in the 'Encycl. Metr.,' which has a long article on this subject; also a tract from the MSS. of Ben'et College, Cambridge, containing rules for Leonine verses, edited by Dr. Nasmith, 1778.

LEO'NTODON TARA'XACUM (Dandelion), a perennial herbaceous plant of frequent occurrence. The root, leaves, and flower stem (scape) contain much milky juice; but the root only is employed in medicine: though the leaves by blanching can be rendered fit for use as a salad, retaining then only a moderate degree of bitterness. The root of plants which are three or four years old should alone be collected, and at Midsummer; as young plants, or roots collected in spring, merely contain a reddish mucilaginous juice, while those of older plants taken up in summer have a brown bitter and saline juice. Those from rich soil are not so potent as those from a poorer land. The root may either be speedily and carefully dried for preservation, or the expressed juice may be inspissated, and so form what is termed the extract.

The chemical constitution is—a peculiar bitter principle, grumous sugar and inulin, and probably some important salts.

Either an infusion, decoction, or extract possesses sedative, deobstruent, and diuretic properties. In chronic subacute inflammation of the stomach or liver, enlargements of the liver or spleen, it proves more beneficial than almost any other vegetable remedy. In many cases of dropsy, particularly connected with obstruction of the liver, it has often succeeded when all other diuretics have failed. It is very extensively employed in Holland to obviate the effects of the intermittents or agues common there, and with the greatest advantage. The extract, unless very carefully prepared, soon ferments and spoils.

LEOPARDS, the name by which the greater spotted cats are known.

LEOPARDS OF THE OLD WORLD.

The form seems to have its most perfect development in the antient continent and the islands of the Old World, though it must be admitted that the American Jaguar, in point of size, strength, and sturdiness of make, excels the Leopards of Asia and Africa.

The Panther, *Felis pardus* of Linnæus, first claims our notice. It has been a question whether the Leopard and Panther are distinct species, or only varieties. Linnæus, in his last edition of the 'Systema Naturæ,' included under the specific name of *Felis Pardus* the *Panthera, Pardalis, Pardus*, and *Leopardus* of Gesner; *Pardus* mas, *Panthera* femina of Alpin (Ægypt); *Pardalis* of Ray, *Tigris mexicana* of Hernandez; and *Pinuum Dasypus*, Nieremb., *Nat.* Under the specific name of *Onca* he includes *Pardus* s. *Lynx Brasiliensis* of Ray, and the *Jaguara* of Marcgrave. He has no species named *Leopardus;* but Gmelin has, and in his edition we find the following species:—1. *F. pardus*—*F.* cauda elongata, corpore maculis superioribus orbiculatis; inferioribus virgatis—(the description of Linnæus) Schreb., *Saeugth.*, iii, p. 384, t xcix., with the following references and synonyms:—*Felis* ex albo flavicans, maculis nigris in dorso orbiculatis, in ventre longis, Briss., *Quadr.;* the names of Gesner and Ray as quoted above, *Pardus* maculis seu scutulis variis, Ludolf, Æthiop.; *Panthere* of Buffon. 2. *F. Unica, Once*, Buffon. 3. *F. Leopardus*—*F.* cauda mediocri, corpore fusco maculis subcoadunatis nigris. Erxl., *Syst. Mamm.*, p. 509, n. 5; Schreb., *Saeugth.*, iii., p. 387, t. ci.; *Uncia*, Caj., *Op.*, p. 42, Gesn., *Quadr.*, p. 825; *Leopard* of Buffon. 4. *F. Onca*, the Jaguar.

Cuvier separates the Panther from the Leopard specifically. The Panther, *La Panthere*, he makes the *Felis pardus* of Linnæus, and the *Pardalis*, ἡ πάρδαλις of the antients. He describes the Panther as yellow above, white beneath, with six or seven rows of black spots in the form of roses, that is to say, formed by an assemblage of five or six small simple spots on each side; the tail of the length of the body, not reckoning the head. This species he speaks of as being spread throughout Africa and in the warm countries of Asia, as well as in the Indian Archipelago; and he states that he has seen individuals where the ground-colour of the fur is black, with spots of a still deeper black (*Felis melas*, Pér.), but that they do not form a species, observing that both yellow and black cubs have been seen sucking the same mother (1829).* Pennant (*Hist. Quadr.*, 1793 figures a *Black Leopard*, and describes the variety as follows:—'In the Tower of London is a black variety, brought from Bengal by Warren Hastings, Esq. The colour universally is a dusky black, sprinkled over with spots of a glossy black, disposed in the same forms as those of the Leopard: on turning aside the hair, beneath appears a tinge of the natural colour.'

The Leopard, *Felis Leopardus* of Linnæus, as he quotes it (but it is not mentioned by Linnæus in his last edition of the 'Syst. Nat.;' it appears, as we have seen, in Gmelin's edition), Cuvier assigns to Africa, remarking that it is similar to the Panther, but with ten rows of smaller spots. These two species, he adds, are smaller than the Jaguar; and he says that there is a third, a little lower on the legs, with the tail equalling the body and head in length, and with more numerous and smaller spots (*Felis chalybeata*, Herm. Schreb., 101).

Cuvier does not notice the Panther, ὁ πάνθηρ of Aristotle (*Hist. Anim.*, vi. 35), and indeed this animal is supposed by many not to have been one of the Leopard kind. In a note to *Felis chalybeata*, Cuvier states that it is to that species M. Temminck applies the name of Panther; but the former adds that it is certain that the Panther so well-known to the antients, and which appeared so often in the Roman shows and games, could not be an animal from the recesses ('fond') of Eastern Asia.

Cuvier does not insert in the text of his 'Règne Animal' the Ounce of Buffon; but in a note to the second edition he speaks of it as differing from the Panthers and the Leopards by more unequal spots, more irregularly scattered, partly notched or ringed, &c., and as appearing to be found in Persia; adding, that his knowledge of it is only derived

* But note M. Lesson's ('Manuel,' 1827) account of *Felis melas*, Péron, post, p. 431.

from Buffon's figure, and from that which Mr. Hamilton Smith has inserted in the English translation of the 'Règne Animal,' from an individual which had been seen living in London.

The Panther and the Leopard were once regarded by M. Temminck as varieties of the same species, *Felis Leopardus*, but he has separated them specifically in his *Monograph*.

Colonel Smith's Ounce was detected by him in the Tower when that fortress included a menagerie among its attractions. The animal is said to have been brought from the Gulf of Persia, but we only learn that it was very distinct from all other species in make, markings, and general appearance. (See post.)

The same author describes the Panther of the antients as standing higher than the Jaguar, and as approaching in its form, which is slender, to that of the Hunting Leopard, *Felis jubata*, though much larger in proportion.

M. Lesson enumerates the following Leopards as belonging to the Old Continent:—

Felis Panthère, Felis Pardus, Linn., Temm., *Monog.* Less than the Leopard; tail as long as the body and head. *Locality*, Bengal; and probably does not exist in Africa.

Felis Leopard, Felis Leopardus, Lin. (Gmel.), Temm.; *Felis Pardus*, Cuv.; *Fuahd* of the Arabs. Rather less than a lioness; tail (22 vertebræ) of the length of the body. *Locality*, Africa and India.

Felis jubata, the Chetah, or Hunting Leopard. *Locality*, Southern Asia.

Among those *Felidæ* which are distributed in the Polynesian group of islands (Iles Asiatiques de la Polynesie) M. Lesson notices

Felis Melas, Péron, observing that this animal, which M. Temminck believed to be a variety of the Leopard, constitutes, on the contrary, a species entirely confined to Java, and especially in the most isolated eastern districts, such as Blambangan. (Brambanan?) The size of the animal he states to be that of the Panther; its fur of a deep black, on which are traced zones of the same colour but less lustrous. This leopard, which is called *Arimaou* by the Javanese, is used for the singular combats of the *Rampok*, for the details of which M. Lesson refers to the 'Zool. de la Coquille,' t. i., p. 139. He adds that he saw a beautiful specimen belonging to the resident of Sourabaya, and he was assured that *Felis Melas* was not rare in the island. He also refers to *Felis Macrocelis*, Horsfield. *Localities*, Sumatra and Borneo (1827).

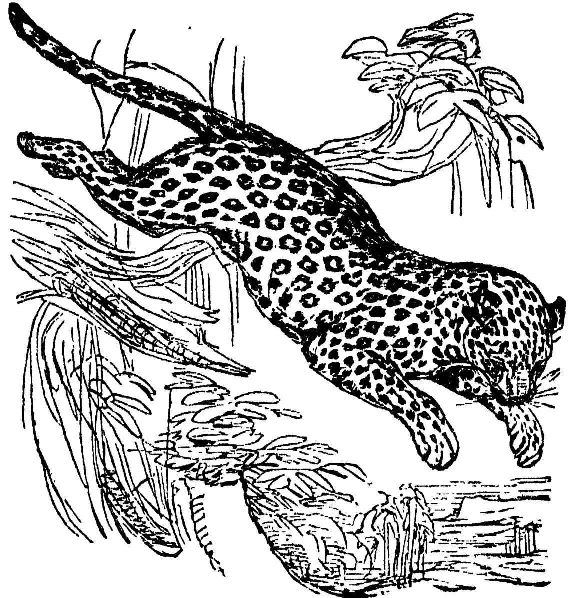
Mr. Bennett (*Gardens and Menagerie of the Zoological Society*, 1830) says, 'Whether the Leopard and the Panther are in reality distinct species, and if so, on what particular characters the specific distinction depends, are questions that have been so variously solved by writers of the highest eminence, that we cannot, without better opportunities for comparison of specimens than we at present possess, adopt the conclusions to which any one of them has come upon the subject. Linnæus, not perceiving any sufficient grounds of distinction, referred both names to one and the same animal; Buffon added a third, that of the Ounce, and increased the confusion by describing as the Panther of the antients, and an animal of the Old Continent, the Jaguar, which is now known to be peculiar to the New; Cuvier subsequently founded a distinction upon the greater or smaller number of rows of spots disposed along the sides of the body; and Temminck, rejecting these characters as unimportant, has lately fixed upon the comparative length of the tail as affording the only sure means of discrimination. In this uncertainty the question remains for the present; but there can be no doubt of the complete distinction between both the animals involved in it and that which we have figured, the mistaken Panther of Buffon, the Jaguar of Brazil, and *Felis Onça* of systematic writers. It may not however be useless to observe, that of the figures given by Buffon as Panthers and Jaguars, that which is entitled the male Panther is in all probability a Leopard; the female is unquestionably a Jaguar; the Jaguars of the original work, and of the supplement, are either Ocelots or Chatis; and that which purports to be the Jaguar or Leopard, although probably intended for a Chetah, is not clearly referrible by its form and markings to any known species.'

Mr. Swainson, in his 'Classification of Quadrupeds' (1835), leaves the question untouched. In his 'Animals in Menageries' (1838), he gives the following species:—

The Leopard, *Leopard*, Cuvier *Felis Leopardus*, H. Smith, in Griff., Cuv

The Panther, *Felis Pardus*, Linn., Hamilton Smith. *Panthère*, Cuvier.

Panther of the antients, *Felis Pardus Antiquorum*, Hamilton Smith, in Synopsis of Griff., Cuv.



The Leopard. Senegal.

Under the title 'Leopard,' Mr. Swainson says, 'Although the names of Leopard and Panther have been long familiar in common language, and have conveyed the idea of two distinct species, yet it is perfectly clear that no scientific writer of the last generation either described, or indeed appeared to know, in what respects the animals differed. It seems that numerous specimens of what is called the leopard are in the Zoological Gardens, and one has been figured in the book so entitled; but Mr. Bennett has not made the slightest attempt to investigate the subject, or to throw any light upon this difficult question. In this dilemma we shall therefore repose on the opinions of Major Hamilton Smith, whose long experience and accuracy of observation are well known, and whose authority in this department of nature deservedly ranks above that of any other naturalist of this country. The Leopard, as defined by Major Smith, when compared with the Jaguar and the Panther of naturalists, is uniformly of a paler yellowish colour, rather smaller, and the dots rose-formed, or consisting of several dots partially united into a circular figure in some instances, and into a quadrangular, triangular, or other less determinate forms in others: there are also several single isolated black spots, which more especially occur on the outside of the limbs. The Panther, according to Professor Lichstenstein of Berlin, "resembles the Jaguar in having the same number of rows of spots, but is distinguished by having no full spots on the dorsal line." But, as Major Smith observes, it does not appear that full spots on the dorsal line always make a specific character of the Jaguar; and the Asiatic Leopard is sometimes distinguished by this peculiarity, though it does not in other respects resemble the American animal. When therefore it is said that the Panther much resembles the Jaguar, it is always to be strongly suspected that the type whence the observations have been taken is in reality an American animal.' Mr. Swainson then, after copying Major Smith's scientific description of the Leopard, proceeds to say, 'Our own opinion of the specific dissimilarity between the Leopard and the Panther, judging from what has been written on the subject, is in perfect unison with that of Major Smith: while the following remark of that observing naturalist, incidentally inserted in his account of the Panther of antiquity, seems to us almost conclusive:—"The open spots which mark all the Panthers have the inner surface of the annuli or rings more fulvous (in other words darker) than the general colour of the sides; but in the Leopard no such distinction appears, nor is there room, as the small and more congregated dots are too close to admit it." In truth, if there is any reliance to be placed in the most accurate figures hitherto published, the small spots of the Leopard and the large ones of the Panther

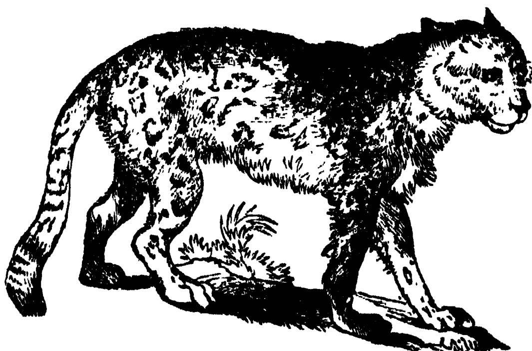
must strike even a casual observer, and lead him to believe that the two animals were called by different names.'

In the 'Gemmæ et Sculpturæ Antiquæ' of Gronovius there is an engraving of a boy driving a car drawn by two Panthers, rather high on their legs, from a cornelian, headed 'Carro di Bacho;' but Gronovius thinks that though this 'reda' may be attributed to Bacchus, it may nevertheless be taken for a representation of one from the Circensian games, for which opinion he gives his reasons. Captain Smyth, R.N., in his interesting 'Descriptive Catalogue of a Cabinet of Roman Imperial Large Brass Medals,' notices a medal of Commodus, on the reverse of which the emperor on horseback galloping across the field, with a chlamys floating behind him, is in the act of casting a dart at a Panther, which is 'showing fight.' He also refers to the figure of a Lynx or Panther on the reverse of one of Septimius Severus, and to that of a Panther (among other animals) on the smaller coins of Gallienus.

With regard to the *Felis Pardus Antiquorum* of Smith, Mr. Swainson remarks that the species, if such it really be, is supposed to be the animal known to antient writers by the name of *Panthera*. It is however, he adds, now so rare, or has been so little distinguished, that Major Smith is only acquainted with one example, which is in the museum of the elector of Hesse Cassel, in whose menagerie it had probably lived. Nothing was known of its native country or of its manners. (See H. Smith's description, including characters intermediate between the Jaguar of America and the Panthers and Leopards of the Old World.)

Mr. Swainson also notices the *Ounce* in the same work, referring to Major Smith's description, and regretting that that able zoologist had not entered into further particulars. Mr. Swainson states that, judging from the figure engraved from Mr. Smith's drawing, he should term it a lower and more thick-set animal than the Panther; the spots larger, more irregular, and much fewer, but differing more especially in having the tail decidedly annulated with black rings, while those of all the Panthers are spotted. The body, he adds, is described as whitish; while yellow or fawn-colour is the universal tint both of the Panthers and Leopards.

In June, 1837, Mr. Gray brought before the notice of a meeting of the Zoological Society of London some Mammalia which he had lately purchased for the British Museum from a collection made by the late Colonel Cobb in India, among which was an adult specimen of the *Once* of Buffon (*Hist. Nat.*), on which Schreber formed his *Felis uncia*, which has been regarded by Cuvier, Temminck, and most succeeding authors as a leopard, but which, continued Mr. Gray, 'is a distinct species, easily known by the thickness of its fur, the paleness of its colour, the irregular form of the spots, and especially by the great length and thickness of the tail. Mr. Gray observed, that a more detailed description of this animal was unnecessary, as it agreed in all particulars with the young specimen described by Buffon.



Ounce. From the specimen in the British Museum.

Of the manners of the true Leopards in a state of nature not much seems to be known. They are very active, climb well, and take their prey by surprise. In captivity they are playful, but apt to be treacherous. Mrs. Bowdich* won the heart of a Leopard by kindness, and, by presenting him with lavender-water in a card-tray, taught him to keep his claws sheathed. The luxurious animal revelled in the delicious essence almost to extacy; but he never was suffered to have it if he put forth his claws. We regret that our limits will not allow us to give this lady's graphic account of her amiable favourite 'Sai, which the reader will find in Loudon's 'Magazine.'

* Now Mrs. Lee

For an account of the prickle occasionally found at the extremity of the tail of the Leopard, see LION.

Among the larger Spotted Cats of the Old World we must notice the *Rimau-Dahan, Felis Macrocelis*, Temm., Hors. *Felis nebulosa?* H. Smith, Griffith.

This species partakes in some measure of the markings of both the Tiger and Leopards, though it seems to be more nearly allied to the latter than to the former.

Description.—Probable size when full grown about four feet from the nose to the root of the tail, which may be reckoned at three feet six inches; height at shoulder about one foot ten inches. Colour whitish grey, with an inclination to ashy or brownish grey, no yellow or red tint. Stripes and spots dark, oblong, irregular, and broad on the shoulders, interrupted and angular on the sides, posterior edges of the broad spots and stripes marked by a line of deep velvet black; limbs stout, feet and toes robust, tail very long, large, and lanuginous.

Locality.—Sumatra. M. Temminck thinks it is also found on the continent of India, having received mantles belonging to the Diakkers made of the skin of this species.

The specimen brought to England alive by Sir Thomas Stamford Raffles was taken when very young in the forests of Bencoolen, and died during the process of dentition soon after its arrival. Dr. Horsfield gives the following dimensions: sex, female:—

	Ft.	In.
Length of the body and head, from the extremity of the nose to the root of the tail	3	0
Length of the tail	2	8
Height at the shoulders	1	4
Height at the rump	1	3
Circumference of the abdomen	2	0
Circumference of the neck	1	2

Sir Stamford Raffles gives the following account of the manners of the species from personal observation made on two individuals:—'Both specimens, while in a state of confinement, were remarkable for good temper and playfulness; no domestic kitten could be more so; they were always courting intercourse with persons passing by, and in the expression of their countenance, which was always open and smiling, showed the greatest delight when noticed, throwing themselves on their backs, and delighting in being tickled and rubbed. On board the ship there was a small Musi Dog, who used to play round the cage and with the animal, and it was amusing to observe the playfulness and tenderness with which the latter came in contact with his inferior-sized companion. When fed with a fowl that died, he seized the prey, and after sucking the blood and tearing it a little, he amused himself for hours in throwing it about and jumping after it in the manner that a cat plays with a mouse before it is quite dead. He never seemed to look on man or children as prey, but as companions; and the natives assert that when wild, they live principally on poultry, birds, and the smaller kinds of deer. They are not found in numbers, and may be considered rather a rare animal, even in the southern part of Sumatra. Both specimens were procured from the interior of Bencoolen, on the banks of the Bencoolen river. They are generally found in the vicinity of villages, and are not dreaded by the natives, except as far as they may destroy the poultry. The natives assert that they sleep and often lay wait for their prey on trees; and from this circumstance they derive the name of *Dahan*, which signifies the fork formed by the branch of a tree, across which they are said to rest and occasionally stretch themselves. Both specimens constantly amused themselves in frequently jumping and clinging to the top of their cage, and throwing a somerset, or twisting themselves round in the manner of a squirrel when confined, the tail being extended and showing to great advantage when so expanded.' (*Zool. Journ.*, vol. i.)

Dr. Horsfield, in the work above quoted, confirms the account of Sir Stamford from his own observation on the individual that was lodged on its arrival in Exeter 'Change. The Doctor, who does not appear to acquiesce in the identity of *Felis nebulosa* with the *Rimau-Dahan*, gives in the same paper a most elaborate and accurate description of the latter, to which we must refer our readers. He also gives a figure (pl. xxi.) from a drawing made by the late William Daniell, Esq., R.A., a few days after the animal had been placed in Exeter 'Change.



Felis Macrocelis.

We now come to a very interesting form, one of those gradations by which Nature appears to pass from one type to another. The *Felis jubata* of Schreber, *Chetah Cheetah*, or *Hunting Leopard*, exhibits both in its external form and habits such a mixture of the Feline and Canine tribes as to justify apparently the appropriate name *Cynailurus*, employed by M. Wagler to designate it as a genus. Thus, as Mr. Bennett bserves (*Tower Menagerie*), the Hunting Leopard, uniting to the system of dentition, the general habit, and many of the most striking peculiarities of the cats, some of the distinguishing features, and much of the intelligence, the teachableness, and the fidelity of the dog, becomes a sort of connecting link between two groups of animals otherwise completely separated, and exhibiting scarcely any other character in common than the carnivorous propensities by which both are in a greater or less degree actuated and inspired. 'Intermediate,' continues Mr. Bennett, 'in size and shape between the leopard and the hound, he is slenderer in his body, more elevated on his legs, and less flattened on the fore part of his head than the former, while he is deficient in the peculiarly graceful and lengthened form, both of head and body, which characterizes the latter. His tail is entirely that of a cat; and his limbs, although more elongated than in any other species of that group, seem to be better fitted for strong muscular exertion than for active and long-continued speed.' From these and other indications, Mr. Bennett is of opinion that the animal approaches much more nearly to the cats than the dogs, and continues it among the former. The anatomy of the Cheetah, as subsequently demonstrated by Mr. Owen at a meeting of the Zoological Society of London, shows indeed that, in internal structure, this leopard is undoubtedly feline: of its habits we shall hereafter have occasion to speak. In the paper last above alluded to, 'On the Anatomy of the *Cheetah*, *Felis jubata*, Schreb.,' Mr. Owen commenced by remarking on *Felis* as a truly natural genus, and by observing that the anatomical structure of the animals composing it offers even fewer differences than their outward forms. The principal deviation from the common type was stated to be that which obtains in the organs of voice of the *Lion* (and, as Mr. Martin has observed, in those of the *Jaguar* also), where the larynx is situated at a considerable distance from the posterior margin of the bony palate, the soft palate and the tongue being proportionally increased in length, thus forming a gradually expanded passage, which leads to the *glottis*, where the air is rendered so sonorous, to the mouth. This structure, Mr. Owen remarks, may contribute in the Lion to produce the peculiar roar of that animal.

In the *Cats* generally, it was stated, the connexion of the *os hyoides* to the *cranium* is not by a long elastic ligament, as in the Lion, but by an uninterrupted series of bones. This latter structure exists in the *Cheetah*. The *Cheetah* has also the circular pupil of the *Lion*, *Tiger*, *Leopard*, and *Jaguar*, and is perhaps the most diurnal of the genus. In the form of the *œsophagus*, and in the transverse *rugæ* of its lower half, the *Cheetah* was stated to agree with the *Lion*; and, as in it and in the other *Felis*, the *œsophagus* was not prolonged into the abdomen, but terminated immediately after passing through the diaphragm in the stomach. This organ, according to Mr. Owen, has, in the *Cheetah*, all the peculiarities which are found in the genus *Felis*. The intestines also agree in character with those of that group; and the *cæcum*, as usual in it, is simple, having none of the convolution which is found in the *Dog*. The liver, *pancreas*, and spleen resembled those of the *Cats* generally; as did also the kidneys in the arborescent form of their superficial veins,—a form however equally common, Mr. Owen remarks, to the *Viverridæ* and the *Felidæ*, which also agree in having *spiculæ* on the tongue. The viscera of the thorax in the *Cheetah* agreed with those of the *Cats*. The *lytta*, or rudiment of the lingual bone, so conspicuous in the Dog, is reduced in it, as in the other feline animals, to a small vestige. There was no bone of the penis, and the *glans* had retroverted *papillæ*. The elastic ligaments of the ungual *phalanges* existed in the same number and position as those of the *Lion*; they were however longer and more slender, their length alone occasioning the incomplete retraction of the claws as compared with the rest of the *Felidæ*. Mr. Owen concluded by observing that in the circulating, respiratory, digestive, and generative systems, the *Cheetah* conformed to the typical structure of the genus *Felis*. (*Zool. Proc.*, 1833.)*

Mr. Bennett had very good opportunities of examining the Cheetah alive; and we therefore select his

Description.—Ground-colour bright yellowish fawn above; nearly pure white beneath; covered above and on the sides by innumerable closely approximating spots, from half an inch to an inch in diameter, which are intensely black, and do not, as in the leopard and others of the spotted cats, form roses with a lighter centre, but are full and complete. These spots, which are wanting on the chest and under part of the body, are larger on the back than on the head, sides, and limbs, where they are more closely set; they are also spread along the *tail*, forming on the greater part of its extent interrupted rings, which however become continuous as they approach its extremity, the three or four last rings surrounding it completely. The tip of the tail is white, as is also the whole of its under surface, with the exception of the rings just mentioned; it is equally covered with long hair throughout its entire length, which is more than half that of the body. The outside of the ears, which are short and rounded, is marked by a broad black spot at the base, the tip, as also the inside, being whitish. The upper part of the head is of a deeper tinge; and there is a strongly marked flexuous black line, of about half an inch in breadth, extending from the inner angle of the eye to the angle of the mouth. The extremity of the nose is black, like that of a dog. The mane not very remarkable; consisting of a series of longer, crisper, and more upright hairs which extend along the back of the neck and the anterior portion of the spine. Fur with little of the sleekness which characterizes that of the cats, but exhibiting on the contrary a peculiar crispness not to be found in any other of the tribe. (*Tower Menagerie.*)

Localities.—Asia and Africa, according to Mr. Bennett, who says, 'Chardin, Bernier, Tavernier, and others of the older travellors had related that in several parts of Asia it was customary to make use of a large spotted cat in the pursuit of game, and that this animal was called Youze in Persia and Chetah in India; but the statements of these writers were so imperfect, and the descriptions given by them so incomplete, that it was next to impossible to recognise the particular species intended. We now however know with certainty that the animal thus employed is the *Felis jubata* of naturalists, which inhabits the greater part both of Asia and Africa. It is common in India and Sumatra, as well as in Persia, and is well known both in Senegal and at the Cape of Good Hope; but the ingenuity of the savage natives of the latter countries has not, so far as we know, been exerted in rendering its services available in the chase in the manner so successfully practised by the more refined and civilized inhabitants of Persia and Hindostan.'

* See further Mr. Owen's paper 'On the Anatomy of the *Chetah*' (*Zool. Trans.*, vol. i.), especially his comparative views of the brain in that species and in the *domestic cat*.

Mr. Swainson* states ('Classification of Quadrupeds,' 1835) that the hunting leopards appear to be of two species,—one inhabiting Africa, the other India; and that it deserves attention that one of these possesses a sort of mane, of which the other is said to be destitute. The mane however, in specimens from both localities, seems to be much the same. The animal figured by Pennant as the hunting leopard was brought from India by Lord Pigot. Three others, captured at Seringapatam among the effects of Tippoo, were presented by Lord Harris to George III., who placed them in the Tower. The couple from which Mr. Bennett made his accurate description came from Senegal. The Cheetah was indeed, as the last-mentioned zoologist remarks, very imperfectly known in Europe till of late years. Linnæus does not appear to have been acquainted with it, and Buffon's *Guépard* was described from the skin only. *Guépard* is the name by which the skin of the animal was known commercially, in reference to the Senegal market; and Mr Bennett is of opinion that Buffon described it without suspecting its identity with the Asiatic animal, - 'the trained habits of which, misled probably by the authority of Tavernier, he erroneously attributed to his imaginary Ounce.† Subsequent French zoologists had rectified this error, and it was generally believed that the tamed leopard of Bernier, the Youze; the Guépard, and Tavernier's Ounce, were one and the same animal; but it was not until a year or two ago'—Mr. Bennett wrote the passage quoted in 1829—'that the possession of a living specimen, brought from Senegal, in the menagerie of the Jardin du Roi, enabled M. F. Cuvier to ascertain its characters with precision. The comparison of this African specimen with the skins sent from India, and with the notes and drawings made in that country by M. Duvaucel, at once puts an end to all doubts of the identity of the two animals.'

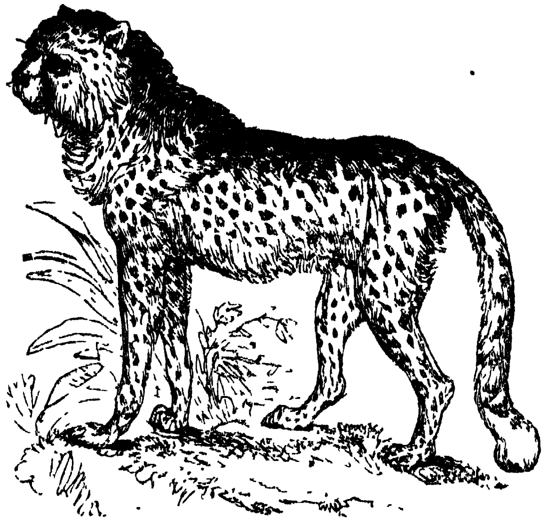
In 1831 Col. Sykes observed that *Felis jubata*, L., and *Felis venatica*, H. Smith (*Cheeta* of the Mahrattas), appear to be identical, the specific differences deduced from the hair originating in domestication. A skin of the wild animal, according to the Colonel, has a rough coat, in which the mane is marked, while domesticated animals from the same part of the country are destitute of mane and have a smooth coat. (*Zool. Proc.*)

Utility to Man.—In the East, where those beautiful animals are employed in the chase, they are carried to the field in low cars whereon they are chained. Each leopard is hooded. When the hunters come within view of a herd of antelopes the leopard is unchained, his hood is removed, and the game is pointed out to him; for he is directed in the pursuit by his sight. Then he steals along cautiously and crouchingly, taking advantage of every means of masking his attack, till he has approached the herd unseen, within killing distance, when he suddenly launches himself upon his quarry with five or six vigorous and rapid bounds, strangles it instantaneously, and drinks its blood. The huntsman now approaches the leopard, caresses him, wins him from his prey by placing the blood which he collects in a wooden ladle under the nose of the animal, or by throwing to him pieces of meat, and whilst he is thus kept quiet hoods him, leads him back to his car, and there chains him. If the leopard fails in consequence of the herd having taken timely alarm, he attempts no pursuit, but returns to his car with a dejected and mortified air.

The skin is an article of some importance in the trade of Senegal, but appears to be neglected at the Cape of Good Hope, where the animal is called *Luipard* by the Dutch colonists; indeed it seems to be of rare occurrence there, for Professor Lichtenstein notices one of the skins as being worn by a Kaffir chief as a badge of distinction.

Of the habits of the hunting leopard, in a state of nature, not much is known: but it may be surmised that it captures its prey much in the same way as it does when employed in the chase. Mr. Bennett gives a very pretty picture of the manners of the two that furnished his description; and as it would be spoiled by abridgment we here insert it:—'They are truly,' writes Mr. Bennett, 'an elegant and graceful pair, having, when led out into the court-yard in their couples, very much of the air and manners of a brace of greyhounds. When noticed or fondled they pur like a cat; and this is their usual mode of expressing pleasure. If, on the other hand, they are uneasy, whether that uneasiness arises from cold, from a craving after food, from a jealous apprehension of being neglected, or from any other cause, their note consists of a short uniform and repeated mew. They are extremely fond of play, and their manner of playing very much resembles that of a cat; with this difference however, that it never, as in the latter animal, degenerates into malicious cunning or wanton mischief. Their character indeed seems to be entirely free from that sly and suspicious feeling of mistrust which is so strikingly visible in the manners and actions of all the cats, and which renders them so little susceptible of real or lasting attachment. The Chetahs, on the contrary, speedily become fond of those who are kind to them, and exhibit their fondness in an open, frank, confiding manner. There can, in fact, be little doubt that they might, with the greatest facility, be reduced to a state of perfect domestication, and rendered nearly as familiar and faithful as the dog himself.'—(*Tower Menagerie*, London, 8vo., 1829.)

Most of the Hunting Leopards brought to England died in no long time after their arrival, and the French seem to have had no better success. The Zoological Society of London succeeded in keeping their specimens very well: the principal food given was lean mutton.



Felis Jubata. (Cynailurus Jubatus, Wagl.)

AMERICAN LEOPARDS.

The *Jaguar*, or *American Panther*, *Felis Onca* of Linnæus, is the form of the Leopard found in the New World. It is the *Onza* of Marcgrave and the *Panther* or *Great Panther* of the furriers.

In form the Jaguar is robust, far stouter than the Leopard, and is very strongly, not to say clumsily built. The body is thicker, the limbs shorter and fuller, and the tail scarcely reaches the ground when the animal is well up on its feet. The head is larger and rather shorter than that of the Leopard, and the profile of the forehead more prominent. When full grown, the animal is said to measure from four to five feet from the nose to the root of the tail. 'These differences of form,' says Mr. Bennett ('Gardens and Menagerie of the Zoological Society'), 'are accompanied by differences in colour and markings equally decisive. The general appearance is at the first glance the same in both; but the open roses of the Leopard are scarcely more than half the size of those of the Jaguar, and they all enclose a space of one uniform colour, in which, unless in some rare and accidental instances, no central spots exist, while in the latter animal most of those which are arranged along the upper surface, near the middle line of the back, are distinguished by one or two small black spots enclosed within their circuit. The middle line itself is occupied in the Leopard by open roses intermixed with a few black spots of small size and roundish form; that of the Jaguar, on the contrary, is marked by one or two regular longitudinal lines of broad, elongated, deep black patches, sometimes extending several inches in length, and occasionally forming an almost continuous band from between the shoulders to the tail. The black rings towards the tip of the latter are also more completely circular than in the Leopard.'

* Mr. Swainson remarks (loc. cit.) that the claws are not retractile. It will be seen, on reference to Mr. Owen's anatomical description, that they are retractile, though the retraction is incomplete.

† But see note, p. 432.

But the skin of the Jaguar is subject to much variation, and Sir William Jardine (*Naturalist's Library*, 'Mammalia,' vol. ii.) gives three figures from different sources illustrating strongly marked differences in the spots.

Locality, South America; Paraguay and the Brazils principally, but it is said to have been found from the southern extremity to the Isthmus of Darien.

Habits, Chace, &c.—Mr. Martin, in his anatomical description of a *Jaguar* that died in the Gardens at the Regent's Park (*Zool. Proc.*, 1832), notices the immense volume of the chest as contrasted with that of the abdominal cavity, a circumstance which might, he thinks, be considered as furnishing an index to the habits and vital energy of this tribe of active and ferocious quadrupeds. That the Jaguar is an animal of great power and frequently of a daring disposition there can be no doubt; but the balance of the evidence is against its equalling, if not exceeding, the royal tiger of the East in ferocity. Of its power D'Azara gives the following anecdote. A Jaguar had struck down a horse; and D'Azara gave instructions that the latter should be drawn within musket-shot of a tree wherein he intended to pass the night, in expectation that the Jaguar would return for his prey. While D'Azara was gone to prepare himself, the Jaguar returned from the opposite side of a river broad and deep, seized the horse in its mouth, drew it to the water some sixty paces, swam across the river with it, landed it and drew it into a wood hard by. All this was witnessed by the person whom D'Azara had placed in concealment to watch till his return.

The Jaguar is a most expert climber. Sonnini saw the scratches left by the claws of one on the smooth bark of a tree some forty feet high without branches. He traced the marks of several slips made by the climber, but the animal had at last reached the top. Humboldt heard the Jaguar's yell from the tops of the trees followed by the sharp shrill long whistle of the terrified monkeys, as they seemed to flee. None of the living quadrumanes or quadrupeds seem to come amiss to it, and birds and fish, which last it is said to take in shallows, are sacrificed to its voracious appetite. The Jaguars will openly seize cattle, horses, and sheep from the enclosures; and the havock made by them is great, as will be easily imagined when we learn from Humboldt that their numbers are such that 4000 were killed annually in the Spanish colonies, and 2000 were exported every year from Buenos Ayres only. Nor are the reptiles free from its attacks. The empty shells of turtles were pointed out to Humboldt as having been emptied of their contents by the Jaguar, which, it seems, watches them as they come to the sandy beeches to lay their eggs, rushes on them, and turns them on their backs. He then insinuates his paw between the shells, and scoops out the contents as clean as if a surgeon's knife had been employed. As the beast turns many more than he can devour at one meal, the Indians often profit by his dextrous cunning. He will, it is stated, pursue this persecuted race into the water where it is not very deep, and will dig up and devour the eggs.

With all this the Jaguar does not seem to be very dangerous to man, when boldly confronted, though D'Azara records frequent instances of his attacking the lord of the creation. The Jaguar will indeed often follow travellers, according to Sonnini and Humboldt, but the latter celebrated naturalist and observer only heard of one instance where a Llanero was found torn in his hammock, and that happened opposite the Island of Achaguas. He relates, on the other hand, a story of two Indian children, a girl and a boy, the one about seven, the other about nine years old, who were at play on the outskirts of a village, about two o'clock in the afternoon, when a large Jaguar came out of the woods bounding towards them playfully, his head down and his back arched, like a cat. He approached the boy, who was not sensible of his danger, and began to play with him, till at last the Jaguar struck him so hard on the head with his paw as to draw blood, whereupon the little girl struck him smartly with a small switch, and he was bounding back not at all irritated, when the Indians, alarmed by the cries of the girl, came up.

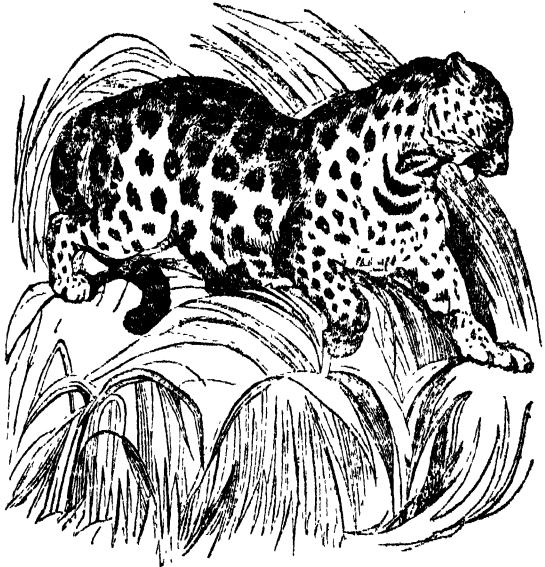
When Mr. Waterton (*Wanderings*) was encamped on the banks of the Essequibo, he was visited by one of these prowlers. 'Whenever the fire got low the Jaguar came a little nearer; and when the Indian renewed it, he retired abruptly; sometimes he would come within twenty yards; and then we had a view of him, sitting on his hind legs like a dog: sometimes he moved slowly to and fro; and at other times we could hear him mend his pace, as if impatient. At last the Indian, not relishing the idea of having such company, set up a most tremendous yell. The Jaguar bounded off like a race-horse, and returned no more. It appeared by the print of his feet next morning, that he was a full grown one.'

The Jaguar is said to make its attacks on quadrupeds by springing upon the neck of his prey; then placing one of his paws upon the back of its head, while he turns round the muzzle with the other, he dislocates the neck and deprives it of life.

He, in his turn, falls a victim to man. The Spaniards and Indians hunt him in various ways. Sometimes he is driven by dogs 'to tree,' in which case he is despatched with the musket or lance; sometimes the pack force him among the bushes, and then is exhibited, sometimes, a daring feat. A single Indian, with his left arm enveloped in a sheep-skin, and with a five-feet lance in his right, goes boldly in to him. The hunter parries the onset of the furious beast with his shielded arm, and at the same time deals him such a thrust with his lance as seldom requires repetition. The lasso is also used with the best effect upon the plains.

There is a black variety of the Jaguar, *Le Jaguar noir* of the French, *Felis nigra* of Erxleben, and probably the *Jaguarete* of Marcgrave.

This seems to have been the animal noticed by Lieut. Maw R.N. (*Journal of a Passage from the Pacific to the Atlantic*, 8vo., London, 1829), at Para, as a 'black onça, or tiger' It had been procured up the rivers by Mr. Campbell, and, when Mr Maw saw it, was a formidable animal. 'I am not sure,' says that gentleman, 'that it had the length of limb of a Bengal tiger, but it was thicker, and, I think, it would have weighed more. When lying down, there appeared to be scarcely any leg, but its thigh was like an immense ham.' Lieut. Maw relates some amusing anecdotes about this animal, for which we refer the reader to his interesting book.



Felis Onça. The Jaguar.

The *Chati*, the *Ocelots*, and other *Tiger-cats*, are noticed under the article TIGERS. The *Puma* is described under the article LION.

LEOPOLD I., emperor of Germany, of the house of Austria, son of Ferdinand III. and of Mary Anne of Spain, born in 1640, was proclaimed king of Hungary in 1655, king of Bohemia in 1657, and, lastly, was chosen emperor in 1659, after a contested election between him and Louis XIV. of France, who had gained four of the electors over to his side. The long reign of Leopold, which lasted nearly half a century, was an eventful time for Germany and Europe, not through any striking qualities of the emperor but in consequence of the many important wars in which he was concerned. On assuming the government of the hereditary states of the house of Austria in 1657, he found himself at war with the Turks, who were overrunning Hungary and had entered Moravia. His able general

Montecuccoli, an Italian by birth, defeated them completely at the battle of St. Gothard, near Neuhausel, after which a truce was concluded. Many of the Hungarian nobles however, whose pride was offended at being the subjects of a foreign power, in their blind wrath preferred joining the Turks. The Catholic intolerance of the Austrian court of that age contributed to irritate the Hungarians, among whom were many Protestants and other seceders from the Church of Rome. The plot was discovered before it was quite ripe, and the leaders, counts Sdrini, Nadasti, Frangipani, and Tekeli, were convicted and beheaded. The malcontents now broke out into open insurrection, and chose for their leader Emeric Tekeli (son of him of the same name who had been executed). In 1682 Tekeli was acknowledged by the Porte as prince of Hungary tributary to the sultan, whose grand-vizier Kara Mustapha entered the field with 160,000 men. Tekeli had with him between 30,000 and 40,000 Hungarians. The combined forces, having defeated the Imperial troops near Raab, advanced to Vienna. It was afterwards ascertained that 'His Most Christian Majesty' Louis XIV was one of the secret movers of this Turkish invasion, as his predecessor Francis I had excited Solyman to a similar expedition against the capital of Austria. Meantime Louis's diplomatic agent at Cracow had hatched a plot with several disaffected turbulent Polish nobles to dethrone Sobieski, who had engaged to assist Leopold. A letter of the French ambassador to his master, being intercepted, discovered to Sobieski the whole plot. With his frank decision and magnanimity of character he repaired to the Diet, read the correspondence, which implicated not a few who were present, expressing at the same time his conviction, whether real or politically assumed, that the whole was a gross fabrication. 'But,' added he, 'let us convince the world also that it is an imposture, let us declare war against the infidels.' The declaration was voted almost unanimously, and Sobieski assembled his troops at Cracow. Meantime Vienna was invested by the Turks on the 15th of July, 1683, after Leopold and his court had left it. Messenger after messenger was now despatched to Sobieski to urge him to march. He had some difficulty, owing to the wretched state of the Polish treasury, to collect even 16,000 men, with which he marched towards the Danube, and was joined by the duke of Lorraine with the Imperial forces, forming in all 70,000 men. On the 11th of September the allied army reached the summit of the Calemberg, which commanded a view of the Austrian capital, and of the wide spreading tents of the Ottomans, who were entrenched around it. On the 12th the battle was fought, the Turks were defeated, and Vienna, and perhaps all eastern Europe, were saved. Hungary was cleared of the Turks after several hard-fought campaigns.

(*Lettres du Roi de Pologne, Jean Sobieski, à la Reine Marie Casimire, pendant la Campagne de Vienne, traduites par le Comte Platen, et publiées par* N. A. de Salvandy, Paris, 1826.)

The court of Vienna now took strong measures to prevent any recurrence of Hungarian insurrection supported by Turkish invasion. At the Diet of Presburg of 1687 the crown of Hungary was declared to be no longer elective, but hereditary in the Austrian male line. Transylvania likewise submitted to Leopold unconditionally. The Turkish war was at length concluded by a great victory gained by Prince Eugene, in September, 1697, near Zenta in Hungary, which was followed by the peace of Carlowitz.

Leopold sustained three wars against Louis XIV., whose ambition aimed at what Bonaparte effected for awhile in our time—the making of all western Europe dependent on France. The first war ended by the treaty of Nymwegen, in 1679, and the second by the peace of Ryswick, in 1697. It was in this second war that the French minister Louvois orde[illegible] the French commanders, in the name of his sovere[illegible] waste the Palatinate by fire and sword. The at[illegible]es committed at Mannheim, Speyer, Oppenheim, and e[illegible]ially at Heidelberg, which was taken and destroyed [illegible], in 1688 and 1693, are frightful; a sketch of them is [illegible] by Putter in his *Historical Development of the Con[illegible]ution of the German Empire*, vol. ii., p. 326. The same system was pursued at the same time, in 1690-91, in Piedmont, the sovereign of which was allied to the emperor. Ca[illegible]t, who commanded the French on the b[illegible] of the Po, [illegible]tructions from Louvois to destroy everything, in order, [illegible]ording to the often since repeated phrase, 'to strike terror among the enemies of France.' After some devastation Catinat, who was not a cruel man, asked for fresh instructions, and represented the deplorable state of the innocent populations. 'Burn and destroy, and burn again,' was the answer of Louvois. (Botta, *Storia d'Italia*, book xxxii.)

The third war of Leopold against Louis XIV. was that of the Spanish succession, to which his son the archduke Charles had undoubted claims. Leopold however did not live to see the termination of it; he died in 1705, and one of his last acts was to confer by letters-patent on the Duke of Marlborough the dignity of prince of the empire, for the victory of Blenheim.

The principal internal events in Germany during the reign of Leopold are: 1. The establishment of a ninth electorate in favour of Ernest Augustus, duke of Brunswick Luneburg, who in 1692 became the first elector of Hanover. This was the act of Leopold, who procured the consent of the other electors to it, in return for important aid in money and troops from two princes of that family. 2. The assumption of the regal title by Frederic, elector of Brandenburg and duke of Prussia, in 1701. Leopold acknowledged him, as he stood in need of his assistance, and Holland, England, and Sweden followed the example. France, Spain, and the Pope refused to acknowledge the new King of Prussia for some time longer. 3. The establishment of a permanent Diet, attended, not by the electors in person, but by their representatives. (Putter's *Historical Development* already quoted; Dunham, *History of the Germanic Empire*.) Leopold's private character was estimable, and his disposition was good and well meaning, but weak, irresolute, and inclined to bigotry. He had the good fortune to meet with, and perhaps the merit of finding out and appreciating, able ministers and generals, whilst his very want of shining talent and the fear excited by the unprincipled ambition of his antagonist Louis XIV procured him allies in various quarters of Europe. He was succeeded by his eldest son. [JOSEPH I.]

LEOPOLD II of Germany and I of Tuscany was the second son of Maria Theresa of Austria and her husband Francis of Lorraine. After Maria Theresa succeeded, by the death of her father Charles VI, to the Austrian dominions, the grand-duchy of Tuscany, which, according to treaties, was to remain separate from the hereditary states of Austria, devolved upon Leopold, his elder brother Joseph being the presumptive heir of the Austrian dominions. As soon as Leopold was of age he took possession of Tuscany, in 1765, and fixed his residence at Florence. During the five and twenty years of his administration he greatly improved the condition of Tuscany, and made it, what it has continued ever since, the happiest and best governed Italian state. His principal reforms concerned the administration of justice and the discipline of the clergy in his dominions. By his 'Motuproprio,' in 1786, he promulgated a new criminal code, abolished torture and the pain of death, and established penitentiaries to reclaim offenders. He finally abolished the Inquisition in Tuscany in July, 1782, and placed the monks and nuns of his dominions under the jurisdiction of the respective bishops. The discovery of licentious practices carried on in certain nunneries in the towns of Pistoia and Prato with the connivance of their monkish directors induced Leopold to investigate and reform the whole system of monastic discipline, and he entrusted Ricci, bishop of Pistoia, with full power for that purpose. This occasioned a long and angry controversy with the court of Rome, which pretended to have the sole cognizance of matters affecting individuals of the clergy and monastic orders. Leopold however carried his point, and the Pope consented that the bishops of Tuscany should have the jurisdiction over the convents of their respective dioceses. Ricci, who had high notions of religious purity, and was by his enemies accused of Jansenism, attempted other reforms; he endeavoured to enlighten the people as to the proper limits of image-worship and the invocation of saints, he suppressed certain relics which gave occasion to superstitious practices, he encouraged the spreading of religious works and especially of the Gospel among his flock, and lastly he assembled a diocesan council at Pistoia in September, 1786, in which he maintained the spiritual independence of the bishops. He advocated the use of the liturgy in the oral language of the country, he exposed the abuse of indulgences, approved of the four articles of the Gallican council of 1682, and lastly appealed to a national council as a legitimate and

canonical means for terminating controversies. Several of Ricci's propositions were condemned by the pope in a bull as scandalous, rash, and injurious to the Holy See. Leopold supported Ricci, but he could not prevent his being annoyed in many ways and at last obliged to resign his charge. The whole of this curious controversy is given in Potter's work 'Vie de Scipion de Ricci,' 3 vols., Brussels, 1825, in which the numerous annexed documents and quotations from other works form the most important part; but the opinions and inferences of the author must be received with caution. Leopold himself convoked a council at Florence, of the bishops of Tuscany, in 1787, and proposed to them 57 articles concerning the reform of ecclesiastical discipline. He enforced residence of incumbents, and forbade pluralities, suppressed many convents and distributed their revenues among the poor benefices, wherein he favoured the parochial clergy, and extended their jurisdiction, as he had supported and extended the jurisdiction of the bishops. He forbade the publication of the bulls and censures of Rome without the approbation of the government; he forbade the ecclesiastical courts from interfering with laymen in temporal matters, and restrained their jurisdiction to spiritual affairs only; and he subjected clergymen to the jurisdiction of the ordinary courts in all criminal cases. All these were considered in that age as very bold innovations for a Catholic prince to undertake.

In his civil administration Leopold favoured the independence and self-administration of the communes, suppressed feudal rights, restrained the power of creating fidei-commissa, abolished the right of common pasture, by which many proprietors were prevented from enclosing their lands, equalized the land tax, abolished the monopolies of tobacco, brandy and other articles, and in all respects favoured liberty of commerce. Meantime he drained the Val di Chiana and part of the Maremme, and fixed colonists in the reclaimed grounds, founded schools and houses for the poor, reformed the universities of Pisa and Siena, opened roads and canals, redeemed great part of the public debt, and lastly he ordered the publication of the national budget. All these and other useful provisions were effected by Leopold during the 25 years of his administration. The principles he laid down have been followed by his successors, and their happy results are more fully adverted to in the article TUSCANY.

By the death of his brother Joseph II., on the 20th Feb., 1790, Leopold succeeded to his vast dominions, as well as to the imperial crown, whilst his son Fredinand succeeded him as grand-duke of Tuscany. On assuming the administration of the hereditary dominions of the house of Austria, Leopold found discontent everywhere, owing, in a great measure, to the rash innovations of his brother; the Netherlands in open revolt; Hungary preparing to follow the example; Bohemia disaffected; the clergy and the court of Rome at variance with the government; Prussia hostile; England estranged; France herself convulsed, and likely to become an enemy; and Russia, the only ally of his predecessor, engaged, as well as himself, in war against the Turks. Leopold had not only abilities, but judgment and honest feelings also. He showed an earnest desire to please his subjects, and he succeeded; he abolished the more obnoxious innovations of his brother; he concluded a peace with the Porte; he pacified Hungary by restoring such of the antient privileges of its proud aristocracy as had been lately disregarded, and at the same time marching troops to restrain the more rebellious nobles, who clamoured loudly for the independence of the people, meaning of themselves, for such is the import of the Hungarian constitution. [HUNGARY.] The next step of Leopold was to endeavour to pacify the revolted states of the Netherlands, by offering to re-establish their antient constitutions. The insurgents having obstinately refused to listen to his offers, he sent troops against them, and the leaders being divided among themselves, Leopold recovered, without much difficulty, those fine provinces; but having refused to restore everything to the state in which it had formerly existed, he offended the inhabitants of Brabant, whose feelings were eagerly worked upon by the French revolutionists, who were seeking for allies everywhere. Then came fresh anxieties concerning the fate of his sister Antoinette and her husband, the convention of Reichenbach, and that of Pilnitz, in August, 1791, between Austria and Prussia, for the purpose of checking the progress of French revolutionary proselytism. But the intentions of Leopold were essentially pacific; the treaty of Pilnitz was defensive rather than offensive, and its object was to settle the affairs of France by negotiation, and not by invasion and dismemberment of that country, as was falsely represented by those who had an interest in exciting the passions of the French people, and plunging them irrevocably into war. In the midst of all these cares Leopold died, on the 1st of March, 1792, aged forty-four years. He was generally regretted for his affability, his strict justice, his kindness towards the poor, whom he admitted freely into his presence, and his enlightened understanding and sound judgment. He was succeeded by his eldest son. [FRANCIS II.]

LEO'STHENES was one of the last successful generals of Athens. He was of the party of Demosthenes: and the violence of his harangues in favour of democracy drew the reproof from Phocion, 'Young man, thy words are like the cypress, tall and large, but they bear no fruit.' He had however gained reputation enough to be chosen leader by a large body of mercenary soldiers, returned from Asia shortly before the death of Alexander, who, on that event being known, were taken openly into the pay of the republic. His first exploit was the defeat of the Bœotians, near Platæa. After this he took post at Pylæ, to prevent the entrance of Antipater into Greece, defeated him, and shut him up in Lamia, a town in Thessaly, to which he laid siege; and from that siege the Lamian war has its name. Leosthenes was killed in the course of it; and after his death success deserted the Athenian arms. [ANTIPATER.] He left a high reputation: his picture, painted by Arcesilaus, is mentioned by Pausanias (1, c. i.) as one of the objects in the Peiræus worthy of notice. (Diod., xviii.)

Another Leosthenes, also an Athenian, was condemned to death, B.C. 361, for being defeated by Alexander of Pheræ. (Diod., xv. 95.)

LEPADITES, one of the many names of the supposed bivalvular opercula of Ammonites, found at Solenhofen, termed Trigonellites by Parkinson, Solenites by Schlottheim, and Aptychus by Meyer.

LEPANTO, GULF OF, the antient Corinthian Gulf, is a narrow sea above seventy miles in length from west to east, extending between the northern coast of the Peloponnesus and the mainland of Greece. It is entered from the west, from an outer bay called the Gulf of Patras, by a strait not quite two miles wide, called the little Dardanelles, which is defended by two castles, the castle of Morea and castle of Roumili. A few miles inside of the straits, on the Roumili or northern coast, is the town of Lepanto, the antient Naupactos, built on a hill, and commanded by a castle, with a good harbour, and between 2000 and 3000 inhabitants. The town was for a long time in possession of the Venetians, who fortified it and sustained several sieges against the Turks, to whom it was finally given up by Venice at the peace of Carlowitz in 1697, as well as the castle of Roumili and the fortress of Prevesa, while the republic retained the Morea. The country around Lepanto, which is part of antient Locris, produces wine, oil, corn, rice, and tobacco. Leather is also an article of export.

The sea of Lepanto widens towards the middle to the breadth of 12 or 13 miles, exclusive of several deep bays which indent its northern coast, especially the Bay of Salona, the antient Crissæan Gulf, which stretches about eight miles to the north. The eastern extremity of the sea of Lepanto terminates in two bays; that of Corinth to the south-east, where the Lechæum or western harbour of Corinth once was, and the other, which is deeper and extends to the north east, bordering on the territory of Megaris and stretching to the foot of Mount Cithæron. This last bay is now called Livadostro.

Lepanto has given its name to a celebrated naval battle between Turks and Christians, fought on the 7th October, 1571, in which the Ottomans were utterly defeated. The Christian allied fleet, consisting of Spanish, Venetian, Genoese, and Papal ships, about 210 in all, was commanded by John of Austria, under whom were Giannandrea Doria, the Venetian Proveditor Barbarigo, the prince of Parma, and Marcantonio Colonna. The Turks, with about 300 sail, many of them however badly equipped, were commanded by Ali Pacha, who had under him Dragut, Uluc Ali, and other veterans who had served in their youth under Khair Eddin Barbarossa. The Turks had just taken the island of Cyprus, where they had most perfidiously broken the capitulation of Famagosta, and had tortured to death many of its gallant defenders. [CYPRUS.] The Christians

in the fleet were animated by indignation at this recent outrage, and burned for vengeance. The Christian fleet was stationed near the Echinades, now Curzolari, some small islands off the mouth of the Achelous, at the entrance of the Gulf of Patras, when the Turkish fleet came out of the Gulf of Lepanto to meet it The Christians broke through the centre of the Turkish line, took the admiral's ship and killed the admiral Ali At the same time the Turkish right being repulsed in an attack on the Venetian ships, the defeat of the Ottomans became complete. Gianandrea Doria alone manœuvred in a very suspicious manner on that day, stood off at sea, took no part in the fight, and endangered the safety of the rest of the fleet This was attributed by some to the antient jealousy of Genoa against Venice The conduct of Doria was generally censured, and has never been satisfactorily explained More than 3000 of the Christians were killed, including many officers, especially of the Venetians, and a still greater number were wounded The Venetian commander, Barbarigo, who contributed greatly to the victory, was mortally wounded, and expired after seeing the Turks utterly defeated The lost of the Ottomans was much greater, as the Christians gave no quarter during the heat of the battle Several thousand Christian slaves who were employed to row the Turkish galleys were liberated One hundred and seven Turkish ships were taken and most of the others were sunk, about thirty or forty escaped This defeat completely destroyed the ascendency of the Turkish navy in the Mediterranean Solemn thanksgivings and rejoicings were celebrated at Venice and Rome, funeral honours were paid to the dead, and the surviving commanders on their return were received in triumph. Fernando Herrera, the lyric Spanish poet of that age, wrote some of his finest odes in commemoration of the battle of Lepanto, and it is recorded that another distinguished Spanish author, Cervantes, was present in the battle, serving on board one of the ships, where he was severely wounded, and lost for life the use of his left hand (Herrera, *Relacion de la guerra de Chypre y Suceso de la Batalla de Lepanto*, Botta, *Storia d'Italia*, b. xiii) The battle of Lepanto is often called by Italian writers the battle of the Curzolari

LEPAS [Cirripeda]

LEPEDOLITE *Lilac Mica*. Occurs massive, and is usually composed of small flexible thin scales Fracture uneven. Colour pearl-grey, peach-blossom, rose and purple, red, and greenish The scales, which are sometimes hexagonal, are translucent. Specific gravity 2·85.

Before the blow-pipe melts into a spongy semi-transparent white globule.

Analysis by Dr Turner of the red variety from Moravia :—

Silica	50 35
Alumina	28·30
Potash	9·04
Lithia	4 49
Oxide of manganese . .	1·23
Fluoric acid and water . .	5 20
	98·61

It is found in granite near Rosena in Moravia, at Perm in Russia, at the Isle of Uton in Sweden, and in North America.

LE'PIDI, the name of one of the most distinguished families of the patrician gens or clan of Æmilii Those most worthy of notice are :—

1. Marcus Æmilius Lepidus, who was sent as ambassador to Ptolemy, king of Egypt, at the close of the Second Punic War, B.C. 201. (Polyb, xvi 34, Liv., xxxi. 2; compare Tac., *Ann.*, ii. 67) He obtained the consulship B.C 187 (Liv, xxxix. 6, 56; Polyb., xxiii. 1), and again in B C. 175 In B.C 179 he was elected Pontifex Maximus and Censor (Liv., xl. 42, 45. Gell., xii. 8). He was Princeps Senatus six times (Liv, *Epit.*, 48.) He died B.C 150.

2. Marcus Æmilius Lepidus, Prætor B C 81; after which he obtained the province of Sicily (*Cic*, *Verr.*, iii 91) In his consulship, B C 78, he endeavoured to rescind the measures of Sulla; but was driven out of Italy by his colleague Quintus Catulus, and by Pompey, and retired to Sardinia, where he died in the following year, while making preparations for a renewal of the war (Appian, *Civ.*, i. 105; Liv, *Epit.*, 90, Plutarch, *Pomp*, 16.)

3. Marcus Æmilius Lepidus, the Triumvir, the son of the preceding, was Ædile B.C. 52, and Prætor B.C. 49, in which year Cæsar came to an open rupture with the senatorian party. [Cæsar; Antonius.] Lepidus from his first entrance into public life opposed the senatorian party; and though he does not appear to have possessed any of the talent and energy of character by which Antony was distinguished, yet his great riches and extensive family connections made him an important accession to the popular cause On the first expedition of Cæsar into Spain, Lepidus was left in charge of the city, though the military command of Italy was entrusted to Antony During Cæsar's absence, Lepidus proposed the law by which Cæsar was created Dictator.

In the following year, B.C. 48, he obtained the province of Hispania Citerior, with the title of Proconsul; and in B C. 46 was made consul with Cæsar, and at the same time his master of the horse,—an appointment which again gave him the chief power in Rome during the absence of the dictator in the African war. In B.C. 44 he was again made master of the horse, and appointed to the provinces of Gallia Narbonensis and Hispania Citerior, but he did not immediately leave Rome, and was probably in the senate-house when Cæsar was assassinated. After the death of Cæsar, Lepidus was courted by both parties, and the Senate, at the motion of Cicero, decreed that an equestrian statue should be erected to his honour in any part of the city he might fix upon. Lepidus promised to assist the Senate; but at the same time carried on a secret negotiation with Antony On his arrival in his province, being ordered by the Senate to join Decimus Brutus, he at length found it necessary to throw off the mask, and instead of obeying their commands, united his forces with those of Antony

In the autumn of this year, B.C 43, the celebrated triumvirate was established between Antony, Lepidus, and Octavianus (Augustus), and in the division of the provinces, Lepidus received the whole of Spain and Gallia Narbonensis The conduct of the war against Brutus and Cassius was assigned to Antony and Augustus, while the charge of the city was entrusted to Lepidus, who was again elected consul (B C 42) After the defeat of Brutus and Cassius, Antony and Augustus found themselves sufficiently powerful to act contrary to the advice and wishes of Lepidus, and in the new division of the provinces, which was made after the battle of Philippi, Spain and Gallia Narbonensis were taken from Lepidus, and Africa given to him instead Lepidus had now lost all real authority in the management of public affairs, but he was again included in the triumvirate, when it was renewed B C 37. In the following year he was summoned from Africa to assist Augustus in Sicily against Sextus Pompeius, and he landed with a large army, by means of which he endeavoured to regain his lost power, and make himself independent of Augustus But in this attempt he completely failed Being deserted by his own troops, he was obliged to implore the mercy of Augustus, who spared his life, and allowed him to retain his private property and the dignity of Pontifex Maximus, which he had obtained on the death of Julius Cæsar, but deprived him of his province and triumvirate, and banished him, according to Suetonius, to Circeii (*Octav*, c. 16).

After the battle of Actium, his son formed a conspiracy for the assassination of Augustus on his return from the East, which was discovered by Mæcenas; and Lepidus, having incurred the suspicion of his former colleague, repaired to Rome, where he was treated, according to Dion Cassius (liv, p. 607, 608, Stephan.) with studied insult and contempt. He died B C 12.

(Cicero's *Letters and Orations*; Cæsar's *Civil War*; the *Epitomes* of Livy, Dion, Appian, &c.; Clinton's *Fasti Hellenici*, and Drumann's *Geschichte Roms*.)

LEPIDODENDRON (λεπίς, a scale, and δένδρον, wood), an important genus of fossil plants, in the examination of which Sternberg (*Flora der Vorwelt*), Brongniart (*Végétaux Fossiles*), and Lindley (*Fossil Flora*) have signalized their abilities, not without success, though some uncertainty yet attaches to the botanical relations of these singular specimens of the flora of earlier nature. M. Brongniart in 1822 and again in his *Prodrome* (1828) referred the lepidodendra to the natural group of Lycopodiaceæ, pointing out however their analogies to Cycadeæ and Coniferæ, and assigned the following characters:—

Stems dichotomous, covered near the extremities with simple linear or lanceolate leaves, inserted on rhomboidal areolæ; lower part of the stems leafless; the areolæ for their insertion marked in the upper part with a transverse cicatrix, of a deltoid figure, the lateral angles acute, the inferior angle obtuse or wanting. The form of the cicatrix of the leaves is the essential character of the genus, it in-

dicates that the leaves were nearly trigonal at the base, becoming plane at some distance therefrom, with a strong midrib. A rounded cicatrix distinguishes the leaf-base of stigmaria, which was perhaps an aquatic plant of the same natural group as the terrestrial Lepidodendron.

The stems thus named and characterised attain the size of 60 or 70 feet in length, with a diameter exceeding 3 feet their whole surface is covered by rhomboidal eminences, arranged in spiral rows, so as to present a beautiful quincuncial ornament. In the opinion of M Brongniart the mode of division (dichotomous) of the stem and the form of the leaves determine a great affinity between the Lepidodendra and Lycopodiaceæ. The growth of the stem he compares to that of Cycadeæ, and the form of the reproductive organs (cones) shows analogy to Coniferæ, and especially Araucaria.

Dr. Lindley, in the first volume of the 'Fossil Flora of Great Britain,' after discussing the botanical relations of Lepidodendra as far as the facts then collected allowed, thus expresses his opinion. 'Upon the whole, we are led to conclude that the Lepidodendron genus was not exactly like either Coniferæ or Lycopodiaceæ, but that it occupied an intermediate station between these two orders, approaching more nearly to the latter than the former.'

A great addition to the data requisite for determining the problem of the true characters of Lepidodendron was made by the Rev C. V. Harcourt, who discovered a specimen in which the internal structure of a branch was perfectly observable, and which, when cut thin and polished, cleared up many important points. Mr. Witham, the authors of the 'Fossil Flora,' and finally M Brongniart, have published drawings and descriptions derived from this precious fragment. Dr Lindley and Mr. W Hutton (*Fossil Flora*, ii p 51) consider their former view entirely confirmed by this discovery. 'It had a central pith, a vascular sheath surrounding that pith, and fistular passages in its cortical integument thus far it was Coniferous. But as no traces can be found of glandular woody fibre, it can scarcely be said to have had any wood, and it is uncertain whether it had any bark.' 'Its vascular system was confined to the middle of the stem and to the curved passages emanating from it the stem consisted of lax cellular tissue, which became more compact towards the outside, and it had a very powerful communication between the bases of its leaves and the central vascular system thus far it was Lycopodiaceous.' Spiral vessels are stated to be seen round the central cellular tissue, and (tab 113) it is further said, 'the genus was more nearly related to Coniferæ than to Lycopodiaceæ.'



1. Lepidodendron Sternbergii, Brong. From the 'Fossil Flora,' pl. 4.

M Brongniart, renewing his investigations with the aid of these new facts, evidenced by Lepidodendron Harcourtii, adopted a different view concerning the vascular system of the stem, for he supposes the central cellular tissue to be entirely surrounded by a narrow zone of large vessels, 'rayés transversalement' (by Dr. Lindley considered as a loose cellular tissue), as in Lycopodiaceæ and Ferns, without medullary rays, and of which the exterior parts go off in bundles to the leaves.

From the whole discussion he adopts the conclusion that by the interior structure of the stems, as well as by their exterior form, their mode of ramification and the arrangement of their leaves, the Lepidodendra agree almost completely with Lycopodiaceæ, and may be regarded as arborescent groups of that family, which contains in the living creation only small and humble plants, nor does it appear that his conviction is weakened by the comparison of these elongated (cylindrical) fossil 'cones' (Lepidostrobi), which are by most botanists referred to Lepidodendron, with the analogous organs of Lycopodiaceæ and Coniferæ.

The species are numerous, and confined to the older strata, and specially abundant in the coal formation.

(Brongniart, *Histoire des Végétaux Fossiles*, Lindley and Hutton, *Fossil Flora of Great Britain*.)

LEPIDOPHYLLUM. Fossil leaves which occur in the coal formation are thus named by M Brongniart. They appear to have been sessile, simple, entire, lanceolate or linear, traversed by a single, simple midrib, or three parallel nervures, and without secondary nervures. (Some of these belong to Lepidodendron, others to Stigmaria.)

LEPIDOPTERA, one of the orders into which insects are divided called *Glossata* by Fabricius.

This order is composed of those insects which are commonly known by the names Butterflies and Moths, and which possess four wings, usually of large size, and covered with a multitude of minute scales, which to the naked eye appear like powder. The nervures of the wings are not very numerous, and are disposed chiefly in a longitudinal direction: a small tippet like appendage is situated on each side of the thorax at the base of the wings, which appendages are called by Latreille *pterygoda*. The antennæ are almost always distinct, and are composed of numerous minute joints. The parts of the mouth are formed into a proboscis fitted for extracting the nectar from flowers, or conveying other juices to the œsophagus. This proboscis, when not in use, lies spirally folded beneath the head and between two palpi covered with hair, which are usually directed forwards and upwards, and which represent the labial palpi. The proboscis is called, in these insects, *antlia* by Messrs Kirby and Spence, *spiritrompe* by Latreille, and *lingua* according to the nomenclature of Fabricius, and is composed of two subcylindrical tubes, which vary greatly in length in the different species of Lepidopterous insects, and between which there is an intermediate one, formed by their junction, which is effected by means of a series of hooks inosculating one with another like the laminæ of a feather. It is through this central tube that the juices are conveyed, the lateral tubes being intended, as it is supposed, for the reception of air, they are called by Messrs Kirby and Spence *solenaria*, a name which we consider is not wanted, since the two tubes in question represent the maxillæ, and are furnished with minute maxillary palpi at their base. The mandibles and labium in these insects are reduced to mere rudiments. The head, thorax and abdomen are always more or less covered with hair, the former, besides the ordinary compound eyes, is sometimes furnished with simple eyes or stemmata, these however are generally hidden by the hair of the head and, according to M Dalman, do not exist in the diurnal lepidoptera. Of the three segments of which the thorax is composed, the first is usually distinct though small, the others are confluent: the scutellum is triangular, the apex of the triangle pointing towards the head. The abdomen is composed of six or seven distinct segments, and is attached to the thorax only by a small portion of its diameter. There are only two kinds of individuals, males and females.

The principal modifications of the larvæ, or caterpillars, of Lepidopterous insects are noticed in the article INSECTA.

Their food almost always consists of vegetable substances, generally the leaves of plants, some live in rotten, or rather, dead wood, upon which they feed, others feed upon animal substances, and are very destructive to furs, woollen goods, feathers, &c., and the larva of a species of moth (the honeycomb moth, *Galleria cereana*) subsists upon wax, living in bee hives.*

* This larva forms galleries in the honeycomb, which are invariably enclosed by a strong silken web, serving to protect it from the bees and as the moths increase rapidly in number, the hive is of necessity soon deserted by its proper inhabitants.

The *pupæ*, or chrysalises, are incapable of eating or locomotion, and are termed obtected; they usually approach somewhat to an oval form, but are pointed more or less at the posterior extremity. The shape of the pupa however varies much according to the species; and those of Butterflies often present numerous angular projections, and sometimes exhibit brilliant metallic colours. The parts of the perfect insect, such as the head, thorax, segments of the abdomen, wings and legs, can be distinctly traced. Various modifications of the pupa state of the present insects are noticed in the separate articles on species which are described.

Latreille divides this order into three principal groups, according with the three Linnæan genera *Papilio, Sphinx*, and *Phalæna*. To the first group he applies the name *Diurna; Crepuscularia* is used to designate the second; and the third group, or that corresponding to Phalæna of Linnæus, is called by Latreille *Nocturna*.

The group or section *Diurna* comprises those species which fly by day, called Butterflies, in which the antennæ are terminated by a knob, or are at least somewhat suddenly thicker at the extremity; the anterior margin of the posterior wings is simple; the wings are usually erect when the insect is in a state of repose; the larvæ have sixteen legs; the chrysalises are always naked, attached by the posterior extremity, so that the head hangs downwards, and have usually angular projections.

The *Crepuscularia* are distinguished by the antennæ being gradually thicker from the base towards the extremity, and forming a prismatic or fusiform club; the extreme tip is slender, pointed, and often recurved. The wings are in a horizontal position when at rest, or a little inclined; the posterior wings have a rigid spine at the anterior margin, which is received into a hook on the under-surface of the superior wings. The caterpillars have sixteen feet, six of which are thoracic, eight abdominal, and two anal; and many of them have a horn-like process on the upper side of the last segment. The pupæ are never angular like those of Butterflies, but are generally smooth, and sometimes furnished with small spines. The perfect insects generally fly in the morning, evening, or afternoon.

The *Lepidoptera Nocturna* have the antennæ setaceous, or diminishing gradually from the base to the apex, often serrated or pectinated, especially in the male sex: the wings during repose are horizontal or deflexed, and sometimes convoluted and enclosing the body; the posterior wings, as in the Crepuscularia, have a rigid seta on their anterior margin, which hooks into a corresponding groove in the anterior wings. The larvæ differ much in form and in the number of feet they possess, varying from ten* to sixteen. They frequently enclose themselves in a cocoon before assuming the pupa state. The pupa is most frequently smooth, but is sometimes furnished with spines, and in some instances it is hairy.

The perfect insect almost always flies by night or afte. sunset. In some species the females are apterous.

LEPIDO'STROBUS. M. Brongniart gave this name to the Fossil Fruits, supposed to be those of the Lepidodendra, which frequently occur in the coal formation, as at Coalbrook Dale, near Bradford, &c. (*Histoire des Végétaux Fossiles.*)

LEPO'RIDÆ, a family of Rodents, the type of which may be considered as existing in the *Common Hare*.

Linnæus characterized his genus *Lepus*, the second of his order *Glires*, as having two incisor teeth (*dentes primores* ii.), the upper ones double, the interior being the least, and he placed the following species under it, viz. *Lepores timidus, Cuniculus, Capensis*, and *Brasiliensis*. Gmelin added several species, some of which had no claim to a place among the Hares.

Cuvier characterized the Hares as having the upper incisor teeth double, that is to say, each of them has, behind, another smaller one. Their molars, to the number of five, are formed each of two vertical laminæ soldered together. In the upper jaw there is a sixth, which is simple and very small. They have five toes before and four behind, an enormous *cæcum* five or six times larger than the stomach, and furnished within with a spiral lamina (*lame spirale*) which runs throughout its length. The interior of their mouth and the bottom of their feet are furnished with hair, like the rest of their body. He divides the group into—1. *The Hares properly so called*, which have long ears, a short tail, hind feet much longer than the fore-feet, imperfect clavicles, and the suborbital space in the skeleton pierced like network (en réseau). The species are, he observes, rather numerous, and so much alike that it is difficult to define them.

Of *Lagomys*, his second division, he says that the species composing it have the ears moderate, the legs not much differing from each other, nearly perfect clavicles and no tail; they have hitherto, he adds, been only found recent in Siberia, and fossil remains of an unknown species have been detected in the osseous breccia of Corsica.

Mr. Gray's third family of the order *Glires* is named *Leporidæ*, and is thus defined:—

Cutting teeth two in each jaw, or four in the upper one, lower one subsubulate; grinders numerous, rootless; ears generally large; tongue often hairy; eyes large; clavicles none; fore-feet short; hinder ones long; tail none, or very short, hairy; fur soft.

† Cutting teeth four above.

1. [illegible] genus *Lepus*? 2. *Lagomina*, genus *Lagomys*.

†† Cutting-teeth two above.

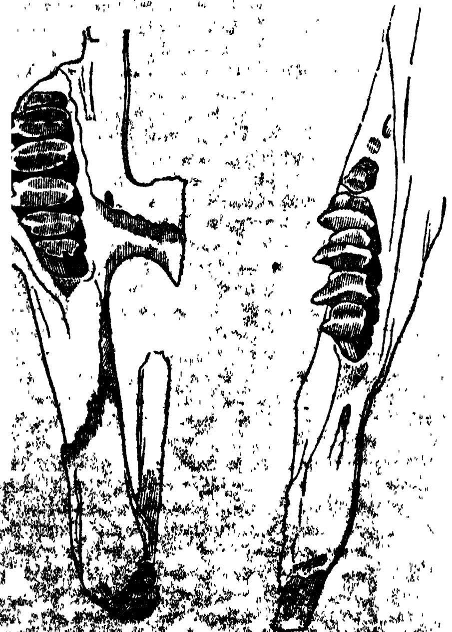
3. *Caviina*, genera *Kerodon*, F. Cuv. 4. *Hydrocharina* (Hydrochærina?), genus *Hydrocharus* (Hydrochœrus), Brisson. 5. *Dasyproctina* (Dasyproctina?), genera *Cœlogenys*, Illig., *Dasyporca* (Dasyprocta?), Ill., *Dolichotis*, Desm.

Mr. Swainson defines the genus *Lepus* thus:—cutting-teeth $\frac{4}{2}$, the upper in pairs, two in front, large and grooved, and two smaller behind; lower teeth square; grinders $\frac{6-6}{5-5}$, composed of two soldered vertical plates; a sixth, very small, in the upper jaw; soles of the feet hairy; anterior feet with five toes; posterior with four; tail very short, turned upwards. *L. timidus*. The common Hare, 11 sp.

Lagomys, Geoff., Mr. Swainson appears to give as a subgenus of *Lepus*.

The subfamily *Leporina* seems to be strictly natural, consisting entirely of those species, and they are not few, which are usually known by the name of Hares and Rabbits.

Dental formula:—Incisors $\frac{4}{2}$, Molars $\frac{6-6}{5-5}=28$.



Teeth of Hare. (F. Cuvier.)

The Common Hare, *Lepus timidus*, which [illegible] ly considered as the type, is too well known to ne[illegible] description, and it will suffice to state that it is the Λαγώς (Lagus) of the Greeks; *Lepus* of the ancient Italians; *Lepre* and *Lievora* of the modern Italians; *Liebre* and [illegible] *bratillo* of the Spaniards; *Lebre* and *Lebrinho* of the Portuguese; *Lièvre* of the French; *Has*, *Haas*, and *Hase* of the Germans; *Haar* and *Hare* of the Danes; *Hara* of the Swedes, according to Mr. Bell; *Hara* of the Anglo-Saxons; *Yegy-*

* There are some few with less than ten.

furnog, Ceinach, of the ancient British; *Maukin* of the Scotch.

The usual weight of a full-grown Hare is eight or nine pounds; but one is mentioned in Loudon's Magazine of extraordinary size: this weighed thirteen pounds one ounce and a half.

We must here notice the Irish Hare, *Lepus Hibernicus*. The Earl of Derby appears to have been the first who drew particular attention to it, and it was described in the 'Proceedings of the Zoological Society' by Mr. Yarrell in 1833. Mr. Jenyns gives it as a variety of *Lepus timidus*; [illegible] Bell (*British Quadrupeds*) states that a careful examination of several specimens has assured him that it is not merely a variety of the common Hare of England, but that it is specifically distinct. He mentions the following differences of character:—The Irish Hare is somewhat larger; the head is rather shorter; the ears are even shorter than the head, while those of the English Hare are fully an inch longer; the limbs are proportionally rather shorter; and the hinder legs do not much exceed the fore legs in length. The fur is also remarkably different: it is composed exclusively of the uniform soft and shorter hair which in the English species is mixed with the black-tipped long hairs that give the peculiar mottled appearance of that animal; it is therefore of a uniform reddish brown colour on the back and sides. The ears are reddish grey, blackish at the tip with a dark line near the outer margin. The tail is nearly of the same relative length as in the common species.

It further appears that *Lepus Hibernicus* is the only Hare found in Ireland, which may account for its remaining so long unnoticed; for opportunities of comparison could not have been very frequent. Its fur is considered valueless.

Whether the Irish Hare will take the water willingly does not appear; that the English Hare is, occasionally at least, an accomplished and bold swimmer is manifest from the following account related by Mr. Yarrell in Loudon's Magazine (vol. 5):—'A harbour of great extent on our southern coast has an island, near the middle, of considerable size, the nearest point of which is a mile distant from the mainland at high water, and with which point there is frequent communication by a ferry. Early one morning in spring two hares were observed to come down from the hills of the mainland towards the sea-side; one of which, from time to time, left its companion, and proceeding to the very edge of the water, stopped there a minute or two, and then returned to its mate. The tide was rising; and, after waiting some time, one of them exactly at high water took to the sea, and swam rapidly over in a straight line, to the opposite projecting point of land. The observer on this occasion, who was near the spot, but remained unperceived by the Hares, had no doubt they were of different sexes, and that it was the male that swam across the water, as he had probably done many times before. It was remarkable that the Hares remained on the shore nearly half an hour; one of them occasionally examining, as it would seem, the state of the current, and ultimately taking to the sea at that precise period of the tide called slack-water, when the passage across could be effected without being carried by the force of the stream either above or below the desired point of landing. The other Hare then cantered back to the hills.'

The female goes thirty days with young, and produces from two to five at a birth; these are born well covered with hair and with their eyes open. The leveret quits the mother and provides for itself in less than a month, and is capable of breeding when it is a year old.

The *Common Hare* sometimes varies accidentally; there is such a variety in the Museum of the Zoological Society of London. All attempts to promote a breed between the hare and rabbit appear to have been hitherto fruitless.

The *Varying Hare*, or *Alpine Hare*, *Lepus variabilis* of Pallas, which changes the colour of its coat with the seasons, requires a short notice. The fur, which is full and soft, is, in summer, grey, intermixed with silky hair of a yellowish brown; the ears are tipped with black, and the under parts are light grey. The tail is white beneath and grey above. As the winter approaches, the fur gradually becomes white, except that on the lips and the tips of the ears, which remains black. In the 'Edinburgh Philosophical Journal,' vol. ii., is an interesting account of the process as it occurs in Scotland, from which it would seem that the winter change of colour takes place without any removal of the hair, as in the Ermine, and somewhat in the same way that the change is effected on the head of the *Black-headed Gull*, *Xema ridibundus*, and in the feathers of other birds. 'About the middle of September,' says the writer in the Journal, 'the grey feet begin to be white, and before the month ends all the four feet are white, and the ears and muzzle are of a brighter colour. The white colour gradually ascends the legs and thighs, and we observe under the grey hairs whitish spots, which continue to increase till the end of October; but still the back continues of a grey colour, while the eyebrows and ears are nearly white. From this period the change of colour advances very rapidly, and by the middle of November the whole fur, with the exception of the tips of the ears, which remain black, is of a fine shining white. The back becomes white within eight days. During the whole of this remarkable change in the fur, no hair falls from the animal; hence it appears that the hair actually changes its colour, and that there is no renewal of it. The fur retains its white colour until the month of March, or even later, depending on the temperature of the atmosphere; and by the middle of May it has again a grey colour. But the spring change is different from the winter, as the hair is completely shed.'

The *Rabbet*, *Rabbit*, or *Coney*, *Lepus Cuniculus*, Linn., *Coniglio* of the Italians; *Conejo* of the Spanish; *Coelho* of the Portuguese; *Koniglein* and *Kaninchin* of the Germans; *Konyn* or *Konin* of the Dutch and Belgians; *Kanin* of the Swedes; *Kanine* of the Danes; and *Cwningen* of the antient British, is known to every one.

The fertility of the animal may be imagined when it is remembered that it will begin to breed at the age of six months, and produce several broods in a year, generally from five to seven or eight at a time. Pennant says, 'Rabbits will breed seven times a year, and bring eight young ones each time. On a supposition that this happens regularly during four years, their numbers will amount to 1,274,840.' The young are blind at their birth, and nearly naked.

The fur of the Rabbit is in considerable demand, particularly for the hat trade; and at one time the silver-haired varieties, or silver-sprigs, fetched three shillings a piece, for ornamental linings to cloaks, &c.; in Pennant's time however the price had fallen to sixpence.

The subfamily *Lagomina* consists of a single genus *Lagomys*, which has the muzzle acute, the ears short and somewhat rounded, the soles of the feet hairy, the claws falcular, and no tail.

Dental formula:—Incisors $\frac{4}{2}$; Molars $\frac{5-5}{5-5} = 26$.

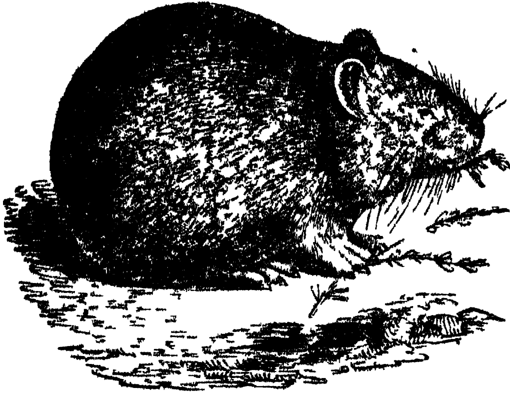
Examples, *Lagomys pusillus*, Desm.; *Lagomys Alpinus*, Desm., *Lepus Alpinus*, Pallas; and *Lagomys Ogotona*, Desm., *Lepus Ogotona*, Pallas. *Locality*, Northern Asia. The form has a wide geographical range, and occurs in the Himalaya Mountains at a considerable altitude. (Royle.)

The first of these species, *Lagomys pusillus* (*Lepus pusillus* of Pallas, *Semlanoi Saetshik*, or Ground Hare of the Russians about the Volga; *Tscholschot* or *Ittsitskan*, or the *Barking Mouse* of the Tartars; *Rusla* of the Kalmucs; *Calling Hare* of Pennant), has the head longer than usual with Hares, and thickly covered with fur, even to the tip of the nose; numerous hairs in the whiskers: ears large and rounded; legs very short; soles furred beneath; its whole coat very soft, long and smooth, with a thick long fine down beneath, of a brownish lead colour; the hairs of the same colour, towards the ends of a light grey, and tipt with black; the lower part of the body hoary; the sides and ends of the fur yellowish. Length about six inches; weight from 3½ to 4½ ounces; in winter scarcely 2½ ounces. (Pallas, Pennant.)

Localities.—The south-east parts of Russia, and about all the ridge spreading from the Ural chain to the south, about the Irtish, and in the west part of the Altaic chain, but nowhere in the East beyond the Oby. (Pallas, Pennant.)

Habits.—Delighting in the most sunny valleys and hills, where the herbage is plentiful and delicate; the *Calling Hares* choose these localities when in the vicinity of a wood, which will afford them a ready refuge in the case of danger or alarm. Their burrows, especially those belonging to the old ones and to females, are curious and intricate, so well concealed amid the shrubs of some dry spot that detection is very difficult; and to increase the difficulty, the animal is said to drop its excrements under some bush, that they may not betray its abode, which would almost defy

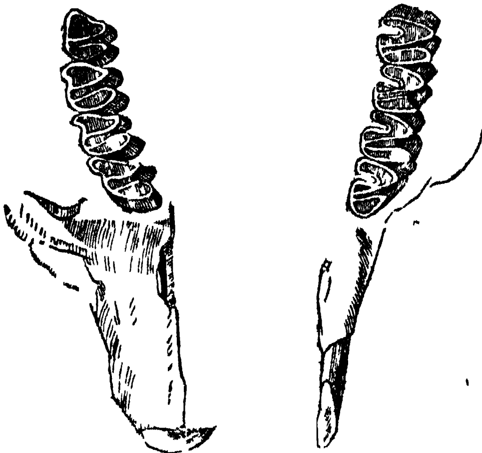
search, were it not for their peculiar cry or call. This is described as being like the piping of a quail, but deeper, and so loud as to be heard at the distance of half a German mile. It is repeated at just intervals, thrice, four times, and even six, at night and morning, but seldom in the day, unless the weather be cloudy. Both the male and female emit this note, but the latter is silent for some time after she has given birth (in May) to her young, which are born naked and blind, and are carefully attended to by the mother, who covers them up warm with the cosy materials of her nest.



Lagomys pusillus

The subfamily *Cavina* consists of the genera *Cavia* and *Kerodon*. An account of the former genus will be found under that title; the genus *Cavia* has the following

Dental formula.—Incisors $\frac{2}{2}$, Molars $\frac{4-4}{4-4} = 20$



Teeth of Cavia Aperea. (F. Cuvier.)

The genus as now modified appears to contain but one species, the well known *Guinea-Pig*, *Cavia aperea* and *Cavia porcellus* of Erxleben, *Cavia Cobaya* of Desmarest and Schreber, *Hydrochærus aperea*, *Hydrochærus cobaya* and *Anœma aperea* of F. Cuvier, *Mus porcellus* of Linn. *Cochon d'Inde* of Buffon and *Variegated Cavy* of Shaw.

Generic Character.—Molars compound, having only one simple lamina and one forked; no tail; fore toes separated, nails short, robust like little hoofs; two ventral *mammæ*.

Geographical Distribution.—The *Guinea-Pig* is now to be found in a semi-domesticated state in most parts of the world, but its original locality appears to have been South America, Brazil, Paraguay, Guiana, &c. The natives eat the flesh, which is said to be well flavoured, resembling that of our wild rabbit.

Hydrochærina. This subfamily, consisting of one genus, HYDROCHŒRUS, has been treated of under that title.

A lengthened notice of the subfamily *Dasyproctina* will be found under the article AGOUTI. The genus *Dolichotis* appears to be founded on the *Patagonian Cavy Dasyprocta Patachonica*, vol. i., p. 214.

FOSSIL LEPORIDÆ.

Of the genus *Lepus* the following species are named: *Lepus diluvianus*, Hare of the Caverns, Cuvier, Buckland, Pander, and D'Alton; *Lepus priscus*, Hare of the osseous breccias, Cuvier. Fossil Hares and Rabbits are also recorded by M. Bourdet, M. D'Orbigny, M. Risso, M. Wagner, MM. Croizet and Jobert, and MM. Marcel de Serres and Pitorre.

The following fossil species of *Lagomys* are recorded: *Lagomys Corsicanus* and *Lagomys Sardus*, from the osseous breccia of Corsica and Sardinia respectively. Other remains of *Lagomys* are noticed by Cuvier, Wagner, M. de Serres, Risso, Chabriol and Bouillet, Croizet and Jobert, Bravard, Sedgwick (Oeningen beds), and Murchison. All tertiary.

Of the Agouti (*Dasyprocta* of Illiger, *Chloromys* of F. Cuvier) remains are noticed by M. Bravard and M. Eichwald. Tertiary.

LEPRA (the Greek word λέπρα, scaliness), an affection of the skin, of the order Squamæ, or scaly diseases, of Willan and Bateman. It is characterised by an eruption of circular spots of inflamed skin covered with scales, varying from the size of a pin's head to that of a shilling or even a half-crown piece, occasionally mixed with large irregular patches formed by the coalescing of the borders of several contiguous spots. The scales in this affection possess a peculiar character, by which it is distinguished from pityriasis and psoriasis, other diseases of the same order. From the surface of the inflamed spots a diseased cuticle is produced, which concretes into thickish crusts or scales of a glistening white silvery appearance, and from being secreted more abundantly towards the circumference a rounded and elevated form is given to the outer margin, whilst the centre is left almost or entirely free from scale. The whole is surrounded by a slight areola of redness. In the early stage of the disease and in the small spots, the inflamed skin, which is slightly raised above the surrounding parts, possesses only a thin scaly covering, and in the larger patches formed by the coalescence of several spots, the characteristic appearances become somewhat confused, still, on careful examination, the elevated margin, circular outline, and central free spot may more or less be recognised.

This disease generally affects young people from the age of puberty up to thirty, and appears to occur more frequently in women than in men. Sometimes the whole body becomes affected by it, even the face and scalp, but more commonly it is confined to the limbs, and is observed especially on the skin below the knee and elbow, in which situations its true characters are generally most marked. The health of persons affected with this disease is but little disturbed, the accession of the eruption alone being preceded by headache and slight febrile disturbance. It is generally tedious of cure, recurring periodically in some constitutions, whilst in others it will continue for two or three years. Most frequently it arises without any assignable cause, occasionally it has appeared to be dependent upon suddenly suppressed cutaneous transpiration from persons drinking cold water when overheated.

This disease must not be confounded with the leprosy of the sacred and ancient writers, a term which appears to have been used to express any loathsome affection of the skin, or, as some imagine, to have referred to the disease described in the present day under the term Elephantiasis. [ELEPHANTIASIS.]

LEPROSY. [LEPRA.]

LE'PTIDES, a subfamily of Dipterous insects of the Family Brachystoma (Macquart). The family of insects to which the present section belongs is distinguished by the proboscis being short and membranous, the lips terminal and thick, third joint of the antennæ simple, often spatulate, stylet often dorsal, abdomen usually with five distinct segments. The wings have commonly one submarginal and three posterior cells. The family Brachystoma is divided by Macquart into four tribes or sub-families—*Xylotomæ*, *Leptides*, *Dolichopoda*, and *Syrphidæ*. The first, or the *Xylotomæ*, are distinguished by the third joint of the antennæ being conical, by the wing having two submarginal cells, and by the tarsi being furnished with two small cushions. In the subfamily *Leptides* the antennæ are inserted near the base of the head, and have generally a terminal stylet, the tarsi are furnished with three small cushions, the femora are elongated, the wings have two submarginal and generally five posterior cells. This group contains six genera, of which one (*Clinocera*) is distinguished from all the other Leptides by its possessing only three posterior cells to the wings, the remaining genera having five. In the genus *Leptis* the head is depressed,

the palpi are generally decumbent, with the second joint conical and the third joint short and generally conical. The thorax has a distinct tubercle; body conical and transparent. The species inhabit Europe. The Leptis vermileo (*Musca vermileo*, Lin.) has been separated from Leptis proper by Macquart, and forms the type of his genus *Vermileo*, distinguished chiefly by the body being elongated and depressed, the first joint of the antennæ elevated, and the last conical and horizontal in its direction.

Leptis vermileo of Fabricius, or Vermileo Degeerii, Macquart. This fly is about four or five lines in length, of a yellow colour, having four black streaks on the thorax, and five ranges of black spots on the body; the wings immaculate. The larva somewhat resembles the stick-like caterpillar of the *Geometræ*, and is nearly of a cylindrical form, but narrower towards the anterior extremity of the body; the posterior extremity is furnished with four fleshy tubercles. It lives in sandy districts, forms excavations in the soil, at the bottom of which it secretes itself either wholly or partially. If an insect falls into its trap, it rises suddenly, clasps the insect with its body, and having sucked all its juices, bends itself in the form of a bow, and by suddenly relaxing throws away the remains.

The next genus, *Chrysophila* (Macquart), has the body furnished with velvet-like hair, the palpi elevated and with the second joint cylindrical, the third being generally conical; thorax without a distinct tubercle. Several species are found in Europe. The genus *Spania*, which is the next in succession according to Macquart, has but two distinct joints to the antennæ; it contains but one species. The genus *Atherix* has the third joint of the antennæ distinct: the stylet is generally dorsal; the body depressed. All the species of this genus are European.

The third subfamily, *Dolichopoda*, is distinguished by the second joint of the palpi being membranous, depressed, and covering the base of the proboscis. The stylet of the antennæ is sometimes dorsal and sometimes apical; the eyes are generally separated in both sexes; the abdomen is somewhat cylindrical, or approaches a conical form; wings decumbent, without any discoidal cell, and generally possessing four posterior cells.

The last subfamily, the *Syrphidæ*, is a very extensive group; and although given by Macquart as a division of his family Brachystoma, certainly constitutes a section of higher value than a *subfamily*. [SYRPHIDÆ.]

LEPTOCONCHUS (λεπτός, thin, and κόγχος, a shell), Dr. Rüppell's name for a genus of Pectinibranchiated Gastropodous Mollusks, thus characterized by him:—

Animal.—Head with an elongated proboscis, but which is entirely retractile; mouth without any apparent armour; *tentacles* two, flattened, triangular, short, united at their internal base, supporting the eyes at one-half of their length on their external side. *Foot* moderate, muscular, without any operculum. *Mantle* with a circular border, without ornament, and with a slight prolongation on the left side. *Branchial cavity* with a rather large aperture, the gill composed of a single comb formed of triangular laminæ close set one against the other: at the bottom of this cavity is found the orifice of the ovaria, whence (in the month of July) the eggs come forth in numerous bundles (par paquets nombreux), each enveloped in a viscous sac, which is flattened, elliptical, and three lines in length. In the middle of the branchial cavity is the orifice of the *anus*. On the right side of the neck, a little behind the right tentacle, there is another orifice, which may have some relation to the male organs of generation.

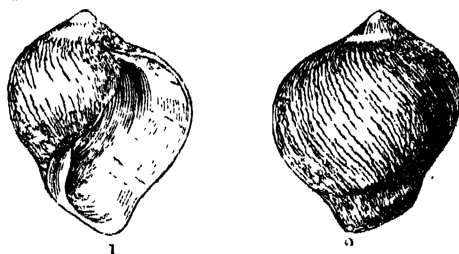
Shell subglobular, delicate, fragile, translucent, with a low spire, which is nearly effaced by the encroachment (surcroissement) of the laminæ of the last whorl; *aperture* large, suboval, with its two extremities turned contrariwise, so that the aperture has some resemblance to the letter S reversed; the two margins *not* united, the right one delicate at all ages, and a little expanded anteriorly as in adult *Janthinæ*; no *columella*: no *umbilicus*.

Example, *Leptoconchus striatus*, Rüpp. The shell of this species, which serves Dr. Rüppell for the type of the genus, is a rather dirty milk white; it is furrowed externally with numerous longitudinal, undulated lines very much approximated. Length of adult 14½ lines; breadth 12½; young 7½; breadth 6.

Locality and Habits.—The Red Sea, where it is found imbedded in the calcareous mass of Polyparia, and having no communication with the water except by a moderate opening. These corals prove almost always to be a species of *Meandrina* (*Meandrina Phrygia*), in which *Magilus, Venerupis*, &c., occur.

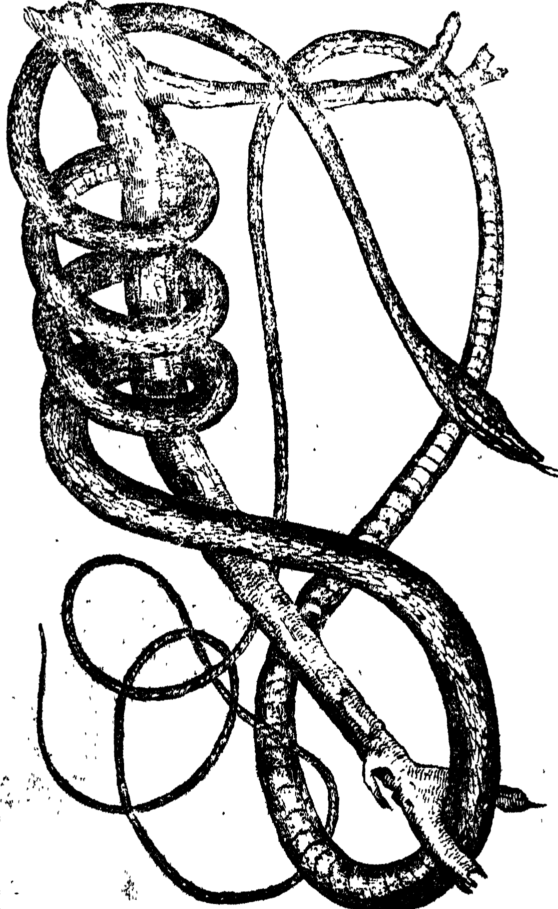
Dr. Rüppell is of opinion, from the few words of M. Rang concerning the young of *Magilus*, that the last-named naturalist had before him the genus above described. Dr. Rüppell notices the following distinctions between *Leptoconchus* and *Magilus*. In the former the margins of the shell are always disunited; in the latter they are always united. The animals of the two genera are distinguished by the possession of an operculum in the one (*Magilus*), and its absence in the other, and by the difference in the proboscis; nor is the siphon of the *Magilus* present in *Leptoconchus*.

Place in the Animal Series.—Dr. Rüppell hazards a suggestion that *Leptoconchus* approximates to the *Janthinæ*. The number of the tentacles, the oval proboscis, the mantle deprived of a siphon, the pectinated branchiæ framed of crowded pyramids, and the absence of an operculum, favour this approximation, as well as the analogies of the shell; but he adds that he is perfectly aware that the difference of the habitations of the two genera is too great to allow of a reliance on this suggestion. (*Transactions of the Zoological Society of London*, vol. i.; *Proceedings* of the same Society, 1834.)



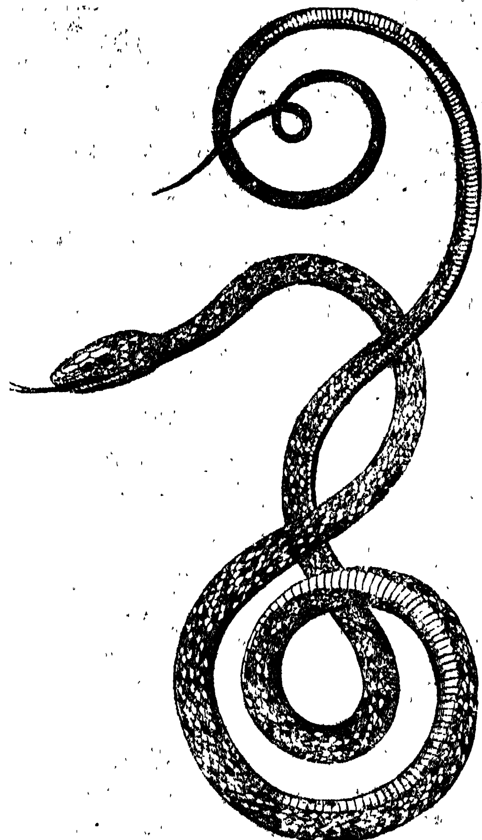
Shell of Leptoconchus striatus. 1, anterior view; 2, view of the back.

LEPTOPHI'NA, Mr. T. Bell's name for a subfamily of


Dryinus auratus. (Bell.)

serpents belonging to the family *Colubridæ*, thus defined by him:—

Head elongate, broad behind, narrowed before; the anterior part covered with nine scuta. Eyes large. Gape wide, somewhat waved. Maxillary and palatine teeth; *no poisonous fangs*. Body very slender, slightly depressed; tail very long, slender, the point acute. Dorsal scales oval, elongate, loose; caudal scales very small, closely arranged. Abdominal scuta very long:* subcaudal scuta small, indistinct. Genera *Dryinus* and *Leptophis*.



Leptophis purpurascens. (Seba.)

'The whole of the serpents composing these genera live,' says Mr. Bell, 'in woods, entwining themselves amongst the branches of trees, and gliding with great rapidity and elegance from one to another. These habits, combined with the graceful slenderness of their form, the beautiful metallic reflection from the surface in some species, and the bright and changeable hues in others, place them amongst the most interesting of the serpent tribe. Their food consists of large insects, young birds, &c., which the extraordinary size of the head, the width of the gape, and the great dilatability of the neck and body, enable them to swallow, notwithstanding the small size of these parts in a state of rest: in a specimen in my possession of *Dryinus auratus*, for instance, the length of which is four feet, nine inches, the diameter of the neck is hardly two lines. When the skin is distended either by food or during inspiration the scales are separated from each other, and the skin, which is of a different colour, becomes visible in the interstices, producing a curious reticulated appearance. Notwithstanding the poisonous mark was affixed by Linnæus to the only species of *Dryinus* known to him (*Coluber mycterizans*, Linn.), it is well ascertained that they are all of them perfectly harmless; and it is asserted of that species that the children are in the habit of taming and playing with them, twining them round their necks and arms, and that the snakes appear pleased at being thus caressed.'

Genera. Dryinus (Merrem).

Generic Character.—Upper jaw much longer than the lower. Rostrum very narrow, more or less acute at the apex, which in some species is distinctly mucronate and moveable. (Bell.)

Mr. Bell records six species, of which are American, Carolina, Mexico, and Brazil; the other three Asiatic, two from the East Indies, one from the Island of Java.

Example, *Dryinus auratus*. Yellowish-grey, shining with pale gold colour, dotted with whitish and black; rostrum subobtuse.

Locality, Mexico.

Leptophis. (Bell.)

Generic Character.—Rostrum obtuse; upper jaw projecting but very slightly beyond the lower.

Mr. Bell records three species, three from the East Indies, and one from America (Carolina). To these Mr. Gray subsequently added two species, *L. punctulatus* and *L. spilotus* (*Coluber spilotus*, Lacép.), collected by the expedition under Captain Phillip Parker King, R.N. (*Survey of Australia*.)

Example, *Leptophis purpurascens* (*Coluber purpurascens*, Shaw). Violet, changing to green, gilded; a lateral and dorsal line of a paler hue; head obtuse. *Locality*, the East Indies. (*Zool. Journ.*, vol. ii.)

LE'PTOPHIS. [LEPTOPHINA.]

LEPTOPODI'IDÆ. [MACROPODIANS.]

LEPTOSO'MUS, a genus of birds established by Vieillot, and belonging to the family *Cuculidæ*. Example, *Leptosomus afer*; *Cuculus afer*, Gmel.; Edolian Cuckoo of Shaw, noticed by the late Major James Franklin, F.R.S., &c., in his 'Catalogue of Birds' collected in the Ganges, between Calcutta and Benares, and in the Vindhyian Hills, between the latter place and Gurrah Mundela on the Nerbudda. (*Zool. Proc.*, 1830-31.) Lieutenant-Colonel Sykes also describes and notices it in his interesting catalogue as occurring in the Dukhun (Deccan), but as being rare. (*Zool. Proc.*, 1832.)

LEPTOSTOMI'NÆ. [INDICATORINÆ, vol. xii., p. 459.]

LEPUS. [LEPORIDÆ.]

LEPUS (the Hare), one of the old constellations, said by Hyginus to be in the act of running from Orion's dog, which is the greater dog, according to some, and the lesser, according to others. It is situated directly under Orion. The principal stars are as follows:—

Character	No. in Catalogue of Flam.	No. in Catalogue of Astron. Society	Mag.	No. in Catalogue of		
		591		14	711	1
		597		15	728	3¾
	3	613		16	739	4
	4	618		17	756	6
	5	616		18	758	4
	6	631		19	763	6
	7	632		(102)	658	6
ξ	8	643		(252)	724	6
β	9	659		(289)	590	5½
	10	669		(307)	600	6
	11	673		(327)	753	5½
	12	702		[743]	626	6
	13	705				

LE'RIDA, called ILERDA in the Roman times, is a town and fortress in Catalonia, on the right or western bank of the river Segre, a few miles above its junction with the Ebro, and not far from the frontiers of Aragon. A fine bridge, the foundations of which are Roman, connects the two banks of the Segre. Lerida is a bishop's see, has a handsome cathedral, several other churches and convents, a military hospital, and 12,000 inhabitants, exclusive of the garrison. It is built partly on the slope of a hill, on the summit of which is the citadel, which has four bastions, and partly along the bank of the river, extending to the foot of another hill, which is also crowned by a fort. Lerida has sustained many sieges; it was taken by storm by the French in the war of the succession in 1707, and again in the last war in May, 1810. The country around is very fertile in corn, wine, oil, pulse, hemp, and flax. Lerida, although

* The length, according to Mr. Bell, is the diameter of the scales from the anterior to the posterior margin; the breadth across the abdomen.

it does not maintain its former importance, is still one of the most considerable towns of Catalonia. It had once a flourishing university, which was suppressed when king Philip V. established that of Cervera. [CATALONIA.] Lerida is 85 miles west of Barcelona.

LERISTA, a genus of reptiles belonging to the family *Scincidæ*, established by Mr. Bell, and thus characterized by him:—

Head scutated, no *eyelids*; *ears* hidden under the skin. *Body* slender, the *scales* smooth and equal. *Feet* four; the *anterior* little, very short, and didactylous; the *posterior* longer, and tridactylous. *Vent* simple, semicircular, no *præanal* or *femoral pores*.

Example, *Lerista lineata*, which is bronze green, paler beneath, with two dorsal and two lateral black lines.

Locality, Australia.

Mr. Bell observes that this new genus agrees with *Gymnophthalmus*, Merr., and *Ablepharus*, Fitzing., in the absence of eyelids, but differs from both in the number of its toes. In addition to this difference in the structure of the feet, it is, he remarks, remarkably distinguished by the want of external ears, and by its elongated and anguiform body, characters in which it agrees with *Saiphos*, Gray. The last named genus, he adds, however, possesses eyelids, and differs also in the number of its toes from *Lerista*. (*Zool. Proc.*, 1833.)

LERNÆA, the Lernæans, which M. de Blainville collected into a family with that name, are parasitic animals adhering to fishes, and have presented some difficulty to zoologists as to their natural position. Cuvier placed them at the end of his *Intestinaux Cavitaires*, Cavitary Intestinal Worms, *Entozoa Nematoidea* of Rudolphi, but as a very different family, and requiring to be divided into many genera when their œconomy is better known. The better opinion seems to be that they are crustaceans, and M. Milne Edwards (1834) so considers them. In his proposed arrangement the *Crustacés Suceurs* form the second subclass of his class *Crustacea*, and consist of two legions: the first, the legion of *Parasytes Marcheurs*, Walking Parasites; the second the legion of *Parasytes Nageurs*, Swimming Parasites. This last legion is composed of the order of *Siphonostomes*, and of the order Lernæans. [PARASYTES NAGEURS.]

LEROI, JULIEN DAVID, born in 1724, was the son of an eminent watchmaker at Paris. Having made choice of architecture as a profession, he applied himself to the study of it in a very different manner from the plodding routine then established, and being anxious to become acquainted with the art in the remains of antiquity then very little known, after passing some years at Rome he visited Greece in 1754. On his return he gave the world the fruits of his researches in his 'Ruines des plus beaux Monumens de la Grèce.' Although not free from numerous errors, which were subsequently exposed by Stuart, and which the author corrected in his second edition (1770), this work had the merit of being the first publication of the kind—the first attempt to show what Grecian architecture actually was. Undoubtedly its value has since been greatly diminished by the more accurate labours of Stuart and others, but its appearance forms an epoch in the chronology of the art. It certainly contributed much to correct the vitiated taste that had long been in vogue in France, and to open new views in regard to architecture, which meritorious aim was assiduously followed up by its author in the excellent lessons he delivered during forty years as professor. His whole life was devoted to his own studies, and the instruction of others, and such were his zeal and disinterestedness, that he cheerfully continued his services as professor gratuitously in the latter part of his life, though the troubles of the Revolution had greatly impaired his fortune, and though the infirmities of age were increasing upon him. He died at Paris, universally regretted, in January, 1803, aged seventy-five. Besides the one above mentioned, Leroi published several other works, among which are 'Histoire de la Disposition, &c. des Temples des Chrétiens,' 8vo., 1764, 'Observations sur les Edifices des Anciens Peuples,' 8vo., 1767; and 'De la Marine des Anciens Peuples,' 8vo., 1777.

LEROS. [ARCHIPELAGO, GRECIAN.]

LESBO'NAX, a Greek rhetorician and philosopher, was a native of Mitylene. He lived in the times of Augustus, and was the father of Potamon, who taught eloquence at Rome under the reign of Tiberius, and was highly favoured by that emperor (Suidas, under *Lesbonax* and *Potamon*). We learn from Lucian that Lesbonax approved of dancing as a means of moral cultivation (*On Dancing*, ii., p. 305, ed. Reitz.)

Suidas informs us that Lesbonax wrote many philosophical works, but none of them are extant. Photius says (*Cod.*, 64) that he had read sixteen orations of Lesbonax, of which however only two have come down to us, one exhorting the Athenians to continue the war against the Lacedæmonians, and the other advising them to attack the Thebans. Some critics have placed the author of these orations in the time of the Peloponnesian war; but a mere perusal of the speeches will show that they must have been written at a much later period. We know moreover from the writings of Libanius, Seneca, Quintilian, &c., that it was very common for rhetoricians to declaim upon subjects chosen from antient history. These orations were first published by Aldus, (Ven. 1513), and afterwards by Stephens, with the Orations of Æschines, Lysias, and others (Paris, 1575), by Gruter (Han., 1619), and also by Reiske, in the eighth volume of the 'Oratores Græci.'

There was also a grammarian of the name of Lesbonax, who probably lived at a later period, who wrote a work entitled Περὶ Σχημάτων, 'concerning grammatical figures,' &c., which was first published by Valckenaer in his edition of Ammonius, p. 177-188.

LESBOS, a large island of the Ægean Sea, near the coast of Asia Minor, being separated from the coast of Troas by the Adramyttian Gulf. Its length is 50 miles from Cape Sigrium, which is its north-western extremity, to Cape Malia, at its south-east end, which last looks directly into the entrance of the gulf of Smyrna. The breadth of the island is very unequal, owing to some deep gulfs which indent its coast, and varies from seven to fifteen miles. Mitylene, the chief town of the island, lies on the south-eastern shore opposite the coast of the antient Æolis. It had formerly two harbours, was a place of great importance, and sent out numerous colonies. Mitylene still exists as a village, and gives its name to the island. Methymna, another antient town of Lesbos, stood on its north-east coast, opposite Cape Lectum on the coast of Troas. The towns of Antissa, Eresus, and Pyrrha stood on the western coast of the island. The deep bay of Pyrrha, which indents the middle of the island, was called Euripus Pyrrhæus, now Porto Kaloni; the other bay further south, west of Cape Malia, is now named Porto di Jero. The island has many villages, but no town of any importance, and contains about 40,000 inhabitants, Greeks and Turks. It is considered one of the most fertile and beautiful of the Greek islands. Its oil and figs are reckoned the best in the Archipelago. In antient times it was known as a place of refinement, luxury, and licentiousness. It produced the best musicians of Greece; some of its first lyric poets, Alcæus and Sappho among the rest; several distinguished philosophers and rhetoricians, among others Theophrastus, Diophanes the friend of Tiberius Gracchus, Theophanes the friend of Pompey, Potamon, who lived at Rome, under the emperor Tiberius, and others. The historian Hellanicus, was a native of Lesbos, as well as the musician Terpander, who invented the lyre with seven chords.

The earliest inhabitants of Lesbos are said to have been Pelasgians; it was afterwards colonized by the Æolians in their great migration. The children of Orestes are said, after fifteen years of vicissitudes and strife, to have conquered the island of Lesbos. [ÆOLIANS.]

Pittacus, who flourished about 600 years B.C., became, according to the Greek meaning of the word, tyrant of Mitylene, and he sustained a war against the Athenians, who had invaded the district of Troas, which was claimed by the Lesbians as their own. The Athenians were ultimately defeated by Pittacus. This was in the time of the Lydian monarchy, after the fall of which Lesbos was obliged to submit to the power of Persia. After the battle of Mycale (479 B.C.) Lesbos freed itself from Persian dependence, and became the ally of Athens. During the Peloponnesian war, the people of Mitylene being accused of a secret negotiation with the Lacedæmonians, Athens sent a fleet against them. The other cities in the island, except Methymna, made common cause with Mitylene. After some resistance the Athenians gained a complete victory, when the walls of Mitylene were razed, and many of its wealthier inhabitants put to death. The Athenians sent an order to their commander to put to death all the males who had attained the age of puberty, but they became ashamed

of their own barbarity, and despatched messengers to revoke the order; the messenger arrived just one day previous to that appointed for the slaughter. (Thucydides, iii. 36-49; Strabo, xiii.) The whole island, except the territory of Methymna, which was spared, being divided into 3000 parts, 300 of these parts were devoted to sacred purposes, and the rest distributed among the Athenians, by whom they were rented to the antient proprietors.

The subsequent history of Lesbos is like that of Chios, Samos, and the other Greek colonies of Asia; it passed successively under the dominion of the Macedonians, the Romans, and the Byzantines; it was afterwards captured by the Venetians, A.D. 1185, was recaptured by the Greeks, and at last seized by the Turks, who retain it to this day. (Strabo, Casaub., 616.) [CLEON.]

LESGHIS. [GEORGIA.]

LESLIE, CHARLES, born about 1650, died in 1722, a person much engaged in the political and theological controversies of the age in which he lived, and some of whose writings, especially the book entitled 'A short and easy Way with the Deists,' are still read and held in esteem. His writings in the political controversies of the time were all in support of high monarchical principles. His theological writings were controversial: they are too many to be particularized in the brief space which we can allot to him, but they have been distributed into the six following classes: those against, 1, the Quakers; 2, the Presbyterians; 3, the Deists; 4, the Jews; 5, the Socinians; and 6, the Papists. Towards the close of life, he collected his theological writings, and published them in two folio volumes, 1721.

His own course in life was very eccentric. He was the son of an Irish prelate, born in Ireland and educated at Trinity College, Dublin. In 1671 he came to England and entered himself of an inn of court with a view to the study of the law. In a few years however he turned himself to divinity, was admitted into orders, and, settling in Ireland, became chancellor of Cloyne. He was living in Ireland at the time of the Revolution, and distinguished himself in some disputations with the Catholics on the side of the Protestant church.

Though a zealous Protestant, he scrupled to renounce his allegiance to King James, and to acknowledge King William as his rightful sovereign. There was thus an end to his prospects in the church, and leaving Ireland he came to England, and there employed himself in writing many of the controversial works of which we have spoken. When James II. was dead, Leslie transferred his allegiance to his son, the Pretender; and as he made frequent visits to the courts of the exiled princes, he so far fell under suspicion at home, that he thought proper to leave England, and join himself openly to the court of the Pretender, then at Bar le Duc. He was still a zealous Protestant, and had in that court a private chapel, in which he was accustomed to officiate as a minister of the Protestant Church of England. When the Pretender removed to Italy, Leslie accompanied him; but becoming at length sensible to the strangeness of his position, a Protestant clergyman in the court of a zealous Catholic, and age coming on, and with it the natural desire of dying in the land which had given him birth, he sought and obtained from the government of King George I. permission to return. This was in 1721. He settled at Glaslogh, in the county of Monaghan, and there he died in 1722.

LESLIE, SIR JOHN, was born 16th April, 1766, at Largo, a village on the coast of Fifeshire. When a child he was weak and sickly, which occasioned frequent interruptions in his elementary education. He however evinced at an early age a decided partiality for geometrical exercises, and a proportional dislike to the study of languages, more particularly of the Latin, although in this he subsequently attained considerable proficiency. With the assistance of his elder brother Alexander, he soon made sufficient progress in arithmetic and geometry to attract the attention of the parochial minister, through whose instrumentality he was probably presented to Professors Robison and Stuart, and by their suggestions, in 1779, to the university of St. Andrews. Here his abilities introduced him to the patronage of the earl of Kinnoul, the then chancellor of the university, who proposed to defray the expenses of his education on the condition that his father would consent to his being educated for the church. After prosecuting his studies at this university during six sessions, he removed in 1783-4 in company with James (now Sir James) Ivory to Edinburgh, where he attended the courses of several of the professors for three years, in which time he was engaged by Dr. Adam Smith to assist in the education of his nephew Mr. Douglas, afterwards Lord Reston. In 1788 he became tutor to two Americans of the name of Randolph, junior students at the university of Edinburgh, with whom he proceeded to Virginia, and after an absence of about twelve months, during which time he visited New York, Philadelphia, &c., he again returned to Scotland. In the early part of 1790 he set out for London with recommendatory letters from several individuals of literary and scientific reputation; and among others from Dr. Adam Smith, who is said on this occasion to have given him for advice, 'never to approach an author whose favour he was solicitous of gaining without first reading his works, lest the conversation should turn that way.'

His intention seems to have been to deliver lectures on natural philosophy, but finding, to use his own words, that 'rational lectures would not succeed,' he determined upon writing for periodical publications as the readiest means of obtaining a subsistence. He accordingly began to furnish articles for the 'Monthly Review,' and about the same time was employed by Dr. William Thomson (whose acquaintance he had originally made at St. Andrews' university) to collect and furnish notes for a Bible which was then being published in parts. From the translation of Buffon's 'Natural History of Birds,' which appeared in 1793, in nine volumes 8vo., he derived sufficient pecuniary emolument to lay the foundation of his subsequent independence.

In 1794 he visited Holland, and in 1796 he proceeded through Germany and Switzerland, in company with Mr. Thomas Wedgwood. Upon his return he became candidate for some professorship in the university of St. Andrews, and shortly after for that of natural philosophy at Glasgow, but in both instances was unsuccessful. In 1799 he again set out upon a continental tour, and travelled through Denmark, Norway, and Sweden, with Mr. Robert Gordon.

In 1805 he offered himself as a candidate for the professorship of mathematics in the university of Edinburgh, which had become vacant by the promotion of Professor Playfair to the chair of natural philosophy. At this period the only production of Mr. Leslie relative to the pure mathematics consisted in an 'Essay on the Resolution of Indeterminate Equations,' written about the time of his quitting the university, and printed in the 'Edinburgh Philosophical Transactions' for the year 1788; but he had published several papers on different branches of physics in Nicholson's 'Philosophical Journal,' and the Royal Society of London had recently awarded to him the Rumford medals for his researches on the nature and propagation of heat, an account of which had appeared the preceding year ('Experimental Enquiry into the Nature and Properties of Heat,' 8vo., 1804). In addition to the reputation he had thus acquired, he came forward with the warmest testimonials of Drs. Maskelyne and Hutton, Sir Joseph Banks, Baron Maseres, and other persons of distinction; but the appointment rested in the magistrates and town council of Edinburgh, subject to a clause in the charter of the university, which declares that the electors shall take advice of the clergy in the choice of professors; and these being desirous of promoting the election of Dr. Thomas Macknight—one of their own body, and a gentleman perhaps equally qualified for the situation—they therefore determined upon opposing that of Mr. Leslie. They grounded their objection upon a note in his 'Enquiry into the Nature of Heat' (page 135, and note 16, p. 522), wherein he refers to Hume's Theory of Causation, which he designates 'a model of clear and accurate reasoning,' whence his clerical opponents somewhat illogically inferred that he had rejected those arguments which are deducible from the observance of nature in proof of the existence and attributes of a Creator. They forthwith made a formal protest against his election, and expressed their determination, in the event of his induction into the office of professor, to prosecute for his immediate ejection. The town council notwithstanding conferred the professorship upon Mr. Leslie, and the clergy accordingly brought the affair before the General Assembly. The debate which ensued (see 'Report of the Debate,' Edin., 1805, 8vo.) and which lasted for two days, was marked by strong party spirit on the side of the plaintiffs, and by the powerful and sarcastic arguments of Sir Henry Moncrieff, who conducted the defence. Near midnight on the second

day (23rd May, 1805), the case was dismissed as 'vexatious.'

Mr. Leslie entered immediately upon his official duties, which he continued to discharge with zeal and assiduity during the fourteen following years. In 1809, upon the death of Professor Playfair, he was called to the chair of natural philosophy, when his first care was directed to the extension of the apparatus required in the more enlarged series of experiments which he thought necessary for the illustration of the course. 'This indeed,' says his biographer Mr. Napier, 'was an object of which, from the first to the last hour of his incumbency, he never lost sight; and it is due to him to state that it was through his exertions that the means of experimental illustration, in the natural philosophy class, were first made worthy of the university.' He was knighted the 27th June, 1832, and died 3rd November of the same year, at his seat at Coates in Fifeshire, about two miles from the place of his birth.

It was about the year 1794-5, while occupied upon a long series of hygrometrical experiments, that he either re-invented or borrowed from the 'Collegium Experimentale' of Sturmius his 'Differential Thermometer.' [THERMOMETER, DIFFERENTIAL.] He supposed the propagation of radiant heat to take place by means of aerial pulsations, a supposition which appears irreconcileable with the existence of radiation *in vacuo*, and equally at variance with the more recent experimental results of MM. Dulong and Petit. He assumed moreover the universality of what is usually termed Newton's law, namely, 'that the decrements of heat of a cooling body are proportional to the difference between its temperature and that of the surrounding medium;' whereas it is known to hold only so long as that difference does not exceed from 40° to 50°. [HEAT.] His own theories indeed sometimes appear to be rather the effusions of a bold and active fancy than the logical deductions from any established facts, and, as an almost inevitable consequence, the results to which they lead him appear equally fanciful. Of this character are his conclusions, that 'the matter of the moon is phosphorescent, and at some future period our satellite will become dim and seem blotted from the blue vault of heaven;' that 'the earth contains a concavity filled with concentrated light, shining with intense refulgence and overpowering splendour,' and others of like nature. He regarded the inventive faculty as the highest with which the mind can be endowed, and attached so little importance to inductive philosophy that he has been heard to deny that any merit is due to Bacon as its founder. As an author, he was deficient in systematic arrangement and simplicity of style. As a lecturer, he was liable to fall short of a satisfactory elucidation of his subject by estimating too highly either the capacity or the previous knowledge of his auditors. But on the other hand, his active curiosity, varied reading, and powerful memory, led to the acquisition of very extensive knowledge, which in many instances he successfully applied to the promotion of science, and 'his exquisite instruments and experimental devices will ever attest the utility no less than the originality of his labours.'

Besides the works noticed in the preceding article, he has left—

'Elements of Geometry, Geometrical Analysis, and Plane Trigonometry,' 8vo., 1809; the same abridged, 1828; 'Geometry of Curve Lines,' 8vo., 1821; 'Philosophy of Arithmetic,' 1817; 'Account of Experiments and Instruments depending on the relations of Air to Heat and Moisture,' 12mo., 1813; 'Elements of Natural Philosophy,' vol. i. (containing Mechanics and Hydrostatics), 8vo., 1823.

In the *Edinburgh Philosophical Transactions*:—'Observations on Electrical Theories,' 1824; 'On certain Impressions of Cold transmitted from the higher Atmospheres, with a Description of an Instrument adapted to measure them,' 1818.

In the *Encyclopædia Britannica*:—Articles 'Achromatic Glasses;' 'Acoustics;' 'Aeronautics;' 'Andes;' 'Angle;' 'Angle, Trisection of;' 'Arithmetic;' 'Atmometer;' 'Barometer;' 'Barometrical Measurements;' 'Climate;' 'Cold and Congelation;' 'Dew;' 'Interpolation;' 'Meteorology;' 'Progress of the Mathematical and Physical Sciences during the Eighteenth Century.'

In the *Edinburgh Review*:—Papers on the 'Memoirs of the Society of Arcueil;' on the 'History of the Barometer;' on 'Delambre's Arithmetic of the Greeks;' on Von Buch's 'Travels;' on Humboldt's 'Physical View of the Equatorial Regions' and his 'Travels;' on the 'Attempts to discover a North-west Passage.'

In Nicholson's *Philosophical Journal*, vols. iii. and iv., 'Description of an Hygrometer and Photometer;' 'On the Absorbent Powers of different Earths;' 'Observations on Light and Heat, with Remarks on the Enquiries of Dr. Herschel.')

Some papers on physical subjects were also read before the Royal Society of London, but none were ever printed in their 'Transactions.'

(*Memoir of Sir John Leslie*, by Macvey Napier, 1838; Chambers's *Biography of distinguished Scotchmen*; *Gentleman's Magazine for* 1833, taken from the 'Caledonian Mercury.')

LESSINNES, or LESSINES. [HAINAULT.]

LESSING, GOTTHOLD EPHRAIM. Such is the number of this author's works and so great the variety of their subjects, that to give a satisfactory account of them alone would require a volume, without touching either upon the incidents of his life or his personal character. Lessing was born at Kamentz in Upper Lusatia, of which place his father was pastor, on the 22nd January, 1729. His attachment to reading displayed itself from his earliest childhood, and he was a devourer of books at an age when others are mere school-boys. Of his extraordinary diligence in study sufficient idea may be formed when it is stated that while at the school at Meissen he perused a number of classic authors besides those which entered into the course there adopted; and further translated the third and fourth books of Euclid, and drew up a history of mathematics. He continued at that seminary till the middle of 1746, when, on taking leaving of it, he delivered a discourse 'De Mathematica Barbarorum.' From Meissen he was sent to the university of Leipzig, where, though he attended many courses of lectures on various branches of learning, his application was not very regular, his attention now beginning to be directed to other pursuits. He began here to form several literary friendships and connections, and acquired a decided taste for the theatre, much to the dissatisfaction of his parents and his sister, who warned him against it as being not only trifling but sinful; while it was also with the extremest difficulty that the family could contribute any allowance for his support. This latter circumstance convinced Lessing that it was time for him to think of shifting for himself. Accordingly he determined to devote his talents to poetry, criticism, and belles-lettres, as that field of literature which had been least of all cultivated by his countrymen, and where, besides having few rivals, he might employ his pen with greater advantage to others as well as to himself. His first productions were one or two minor dramatic pieces, which were printed in a journal entitled 'Ermunterungen zum Vergnügen.'

The departure of his friend Mylius for Berlin determined Lessing to follow him thither, as he hoped there to find himself more favoured by opportunities for literary undertakings. In conjunction with Mylius he began a quarterly publication, 'Beiträge zur Historie des Theaters,' wherein they intended to take an historical and critical view of the drama throughout Europe, a subject then hardly touched upon. The work however was not carried on beyond its fourth number. About the same time he published some of his early poems, and set about studying Spanish, from which he shortly after translated Huarte's 'Examen de los Ingenios;' but he might easily have selected something more likely to fix public attention. Perhaps he showed still less judgement when, in conjunction with his younger brother, Johann Gottlieb, he commenced a Latin translation of Klopstock's 'Messiah,' as if he should be rendering his mother tongue and his countrymen a service by diverting them from the original poem—one that forms an epoch in and gave such an impulse to the German language. Fortunately the brothers learned that a similar translation was undertaken by the Danish chaplain at Madrid; on which they abandoned the task. At this time Lessing was residing at Wittenberg, where his brother was pursuing his studies; but he again returned to Berlin, and formed a close intimacy with Moses Mendelsohn and Nicolai, which had a highly beneficial influence upon all the three. Six eyes, as one of his biographers expresses it, see more than two, especially when one pair of them is fixed upon what is at a distance, another upon what is close by, and the third upon what lies between those extremes. It is not always that such literary partnerships are successful, but in this case there was sympathy of minds and dispositions, together with unity of purpose. One of the first results of

Lessing's and Mendelsohn's joint studies was the dissertation 'Pope als Metaphysiker' (1754), the object of which was to show that the English poet had no fixed philosophical system. Omitting mention of his other literary connections, among whom Ramler stood high in his private esteem, and also of his various translations and less important productions, belonging to this period, we pass on to his 'Miss Sara Sampson,' the first specimen of domestic tragedy in German literature, and also one of the most successful that it has even yet produced. In vain did the critics object to it, that it was a dramatic nondescript, and that it was made up of reminiscences of English novels and tragedies. Little cared the public how it had been produced: it was enough for them that they felt its power and its beauties: it accordingly not only excited a great sensation in Germany, but was translated in other countries. Between this and his next dramatic masterpieces, 'Minna von Barnhelm' and 'Emilia Galotti,' which latter, though composed in 1763, was not ultimately dismissed from the hands of its author till 1772, was an interval which, so far from having been passed unoccupied, astonishes us by the multitude and variety of the subjects on which Lessing then employed his pen.

In 1757 he and his friends Mendelsohn and Nicolai undertook the 'Bibliothek der Schönen Wissenschaften,' which may fairly be said to have been the best literary journal Germany could then boast, and even now it may be referred to with both pleasure and profit for the valuable information and pieces of criticism which it contains. To this period, from 1753 to 1760, during which he resided at Berlin, belong his 'Fables' and his 'Litteraturbriefe,' or 'Letters on Literature' (1759), a life of Sophocles, after the manner of Bayle, and a translation of Diderot's dramatic pieces. From 1760 to 1765 Breslau was his residence, he having accepted the appointment of government secretary to General Von Tauenzien. Here he found himself quite in a new sphere, very advantageous in some respects but in others the reverse; for, greatly to the astonishment of all, he began to addict himself to play with an eagerness quite at variance with a philosophical temperament. If he seldom suffered in pocket, being generally successful at the faro-table, he probably suffered in health, for such was his agitation even while winning, that the perspiration would drop from his forehead. He did not however neglect his studies and his pen, but employed the latter on several antiquarian and literary subjects and topics of criticism. At length he gave up faro and his appointment; returned to Berlin, and the following year published his celebrated 'Laocoon,' the most finished of his prose works, although in itself incomplete. The following year was marked by another literary triumph, namely, his 'Minna von Barnhelm,' and the succeeding one by his 'Dramaturgie' and the 'Antiquarische Briefe.' After this he was preparing to put into execution his long-meditated journey to Italy, when his friend Ebert obtained for him the situation of keeper at the Wolfenbüttel Library (1770), of which celebrated and extensive collection, comprising about 10,000 MSS. and 200,000 printed volumes, he published an account entitled 'Wolfenbüttelschen Fragmente,' 1773. His 'Emilia Galotti,' which, after long remaining in an unfinished state, was completed and published in 1772, has been criticised as manifesting more of psychological study than of poetical impulse, to which objection it has been replied, that it would be well if other dramatists were to follow Lessing's example, and trust more to such study than to poetical inspiration. His last drama, 'Nathan,' which was translated many years ago by the late William Taylor of Norwich, was also almost the last of all his literary productions. From that time, 1779, his health and spirits visibly declined very fast; he became subject to attacks of somnolency in such a degree that he was unable to rouse himself, or even keep awake in the society of his most agreeable friends; so that if he did not, like Swift, 'expire a driveller and a show,' he at least affords another striking instance of great mental power succeeded by complete exhaustion, and that prematurely, for he had entered only into his 53rd year when he died, February 15, 1781.

Few writers who have written so much have written so carefully; and considered with regard to style alone Lessing's works had a most beneficial influence upon German literature. Among them are several masterpieces of various kinds, including his admirable Fables; yet it is not so much for these as for what he did for their literature generally that his countrymen are indebted to him. He was the first to bestow upon it those graces and those æsthetic qualities in which it had till then been deficient.

His brother Karl Gotthelf Lessing (born 10th July, 1740), who published his biography and some posthumous pieces, in 1793, wrote several comedies, which, although now almost forgotten, were not without merit for their humour and liveliness and also exhibited considerable dramatic talent.

L'ESTRANGE, SIR ROGER, was born in Norfolk in 1616. Like his father, he was a royalist, and accompanied Charles I. to Scotland in 1639. He was arrested by the emissaries of the parliament in 1644, and sentenced to be shot as a spy, but some delay having protracted the execution of this sentence, he managed to escape, in 1648, and attempted to raise an insurrection in Kent. This having failed, he fled the country, but returned in 1653, hoping to take advantage of the general act of amnesty. Cromwell having taken his part, his hopes were realized, though this circumstance caused him to be eyed with some suspicion by his friends the royalists. After the Restoration he was appointed censor of the press, and in 1665 he brought out a paper called the 'Public Intelligencer.' He was devoted to the court, and on the approach of the Revolution of 1688 lost all his appointments. He died in 1704.

His works consist of a vast number of political pamphlets, besides translations of Josephus, Cicero's 'Offices,' Seneca's 'Morals,' Erasmus's 'Colloquies,' Æsop's 'Fables,' Quevedo's 'Visions,' &c., &c. He is censured for having used too many vulgar expressions in his versions of classic authors, but on a reference to Echard's low translation of Terence it will be found that this fault was not peculiar to L'Estrange.

In the first number of the 'Intelligencer' appears the following objection to the diffusion of news, which is curious enough as coming from an editor of a newspaper, and as being inserted in the newspaper itself: 'I think it makes the multitude too familiar with the actions and counsels of their superiors, too pragmatical and censorious, and gives them not only an itch but a kind of colourable right and licence to be meddling with their government.'

LESTRIS. [LARIDÆ.]

LE SUEUR, JEAN-FRANÇOIS, a very distinguished French composer, knight of the *Légion d'Honneur*, and director of the music of the Emperor Napoleon, was the descendant of an antient family, and born in 1766. After having been *Maître de Chapelle* of several cathedrals in France, for which he composed a great number of masses, motets, &c., his reputation called him to Paris, where he produced his five grand operas: *La Caverne*, *Paul et Virginie*, *Télémaque*, *Les Bardes*, and *La Mort d'Adam*, all of which display, more or less, a vigour of imagination, a grandeur of style, and a judgment in execution, which induced Sacchini to say, that he knew but two Italians who could be compared to him. That M. Le Sueur possessed a strong active mind may be inferred from his compositions; but of this he gave other proofs, as well as of literary talent; his work on music, adapted to sacred solemnities, is highly esteemed; and a *notice* by him concerning antient music, accompanying the translation of Anacreon by M. Gail, not only shows considerable learning, but, in the opinion of M. Ginguené, has thrown some new light on that very obscure subject, the music of the Greeks.

LETHARGY, a state of unnaturally deep and prolonged sleep, a condition intermediate between the sleep of health and complete coma. If not the result of unusual fatigue, it is often an alarming symptom, indicating congestion of the brain, and a disposition to apoplexy, or even an impending attack of that disease. [APOPLEXY; COMA; SLEEP.]

LETTER or POWER OF ATTORNEY is an instrument by which one person authorizes another to do some act for him: it may be used in any lawful transaction, as to execute a deed, to collect rents or debts, to sell estates, &c. The authority must be strictly pursued, for the principal is only bound by the acts of his agent to the extent to which the letter of attorney authorizes him to proceed, and if the agent goes beyond his authority he is personally liable to the party with whom he contracts. The power authorizing an attorney or agent to do some particular act impliedly includes an authority to do whatever is incident to that act; as for instance, a power to demand and recover a debt authorizes the arrest of the debtor in all cases where

it is permitted by law. But a power to receive money and to give receipts, or even to transact all business, does not authorize the attorney to negotiate bills received in payment. In all written powers, such as letters of attorney or letters of instruction, receive a strict interpretation, the authority never being extended beyond that which is given in terms or is absolutely necessary for carrying the authority so given into effect. An attorney, unless power be specially given him for that purpose, cannot delegate his authority or appoint a substitute; and, generally speaking, the words of general authority usually inserted in letters of attorney after giving the particular authority do not enlarge it.

The authority must be executed during the life of the person who gives it, as the act done is considered to be in every respect his act.

Powers of attorney may be given either in separate instruments or in deeds relating to other matters; the second form is usually followed where the instrument forms part of a security for money, as when a chose in action is assigned either as a security for money or to an actual purchaser. The deed of assignment contains a power of attorney authorizing the assignee to sue in the name of the assignor. Powers of attorney are generally executed under hand and seal, and where they contain an authority to bind the principal by *deed* it is essential that they should be so executed. When the agent signs any instrument which is to bind his principal, he must sign it in the name of the principal, and not in his own name.

A power of attorney unless it be given as a security is revocable at pleasure, either by the personal interference of the principal or by his granting a new power to another person. But if the power has been given as a security it has been decided that it is not revocable; and possibly, though it has been decided that a power of attorney coupled with an interest is revoked by the death of the grantor, so far as it authorizes the agent to act in the name of the grantor or his executors, &c., it may be held that such a power, when given as part of a security, is not revoked by the death of the principal, and that the assignee of his interest has power to do the acts necessary to render his security available in a court of law in the name of the representatives of the assignor; but at all events a court of equity would interfere in favour of the assignee. [Chose in Action.]

A letter of attorney is also in general revoked by the bankruptcy of the principal, unless it is coupled with an interest.

(Paley's *Principal and Agent*, and the various treatises on mercantile law.)

LETTERS PATENT (in Law), the king's letters sealed with the great seal. 'These grants,' says Blackstone (*Comment.* b. ii., ch. 21), 'whether of lands, honours, liberties, franchises, or anything else that can be granted, are contained in charters or letters patent, that is, open letters, *literæ patentes*. They are so called because they are not sealed up, but open to view, with the great seal pendant at the bottom, and are usually directed or addressed by the king to all his subjects at large.' Letters patent in the time of Queen Elizabeth, as well as in several preceding reigns, were not unusually obtained for purposes of mere monopoly.

They are now frequently granted under the royal authority as the reward of ingenuity, and are in some cases the only means by which a man can secure any compensation for a discovery, or for the labour and expense which he may have employed in perfecting an invention. The consideration of the legal rights of patentees, and of the modes in which they may be acquired and secured, properly belongs to the head of Patents. At present it may be sufficient to refer the reader to Collier's 'Essay on the Law of Patents for New Inventions, to which are prefixed two chapters on the general history of monopolies, and on their introduction and progress in England to the time of the Interregnum,' 8vo., Lond. 1803; to Hands's 'Law and Practice of Patents for Inventions,' 8vo., Lond. 1808; Godson's 'Practical Treatise on the Law of Patents,' 8vo., Lond., 1823, with the 'Supplement,' 8vo., Lond. 1832; and Rankin's 'Analysis of the Law of Patents,' 8vo., Lond. 1824.

Many letters patent have been granted by the king to the founders of schools and other charitable endowments, empowering the donor to make rules and ordinances for the government of his charity, and constituting into a body corporate those persons and their successors whom the founder should choose or nominate.

LETTUCE (the *Lactuca sativa*, [illegible]) is one of the principal kinds of vegetables used for salads. It has been introduced and cultivated in this country for nearly three centuries, but, like many other domesticated plants, its origin is unknown. De Candolle [illegible] been brought from India [illegible] supposed identity with the *Lactuca* [illegible] found wild in the mountains of [illegible] several of its varieties indicate [illegible] the Greek Archipelago; and the [illegible] one of the two divisions into which [illegible] of lettuces are usually classed, termed *Cos* [illegible] its name from the island of Cos, the modern [illegible]. This division includes those of an erect oblong [illegible]. The other division, which comprehends those of a [illegible] flattened or spreading form, is termed [illegible] *Cabbage lettuces*. For a selection of the best varieties see Kitchen Garden.

The excellence of lettuces consists in their being crisp and tender; their growth should therefore be so conducted as to sustain no check or interruption. If their quick vegetation is stopped by such causes as excessive drought, overcrowding in the seed-bed, or improper transplanting, they will in consequence either run to seed or become tough, and their juices at the same time will acquire an acrid quality.

The ground intended for the seed should be fresh dug, rich, and mellow. The principal summer crop should be sown in March and April, and thinly covered. If the plants are intended to attain their full perfection where sown, they must be thinned [illegible] inches square in the case of the small cabbage varieties, and the larger sorts should be allowed at least [illegible]. In transplanting, the [illegible] and the [illegible] weather; but at all events it must be [illegible] the plants are too old [illegible] when they are drawn up their stems have commenced lengthening, which, in dry weather, will sometimes happen whilst they are yet in a small state, it is useless to transplant them. It is of importance that the soil in which they are grown be neither too wet nor too dry. Where the breadth to be planted is not so great as to render the expense of labour an object of consideration, instead of making holes for the plants with a dibber, it is better to form a small trench with a perpendicular cut next the line against which the roots are to be disposed without bruising. Water should be given, but not at any one time to excess, nor merely at the root of each plant, but over the whole of the ground.

The Cos lettuces require to have their leaves tied together moderately close with a strip of matting for the purpose of assisting their blanching and rendering them more crisp and delicate. This should be done about a week previous to their attaining full perfection. The Paris Cos requires least assistance in this way, because the tops of its leaves are concave, and consequently apply themselves closely to each other. Successive sowings are requisite to be made occasionally during the summer. Those plants intended to stand the winter should be sown in the end of August or beginning of September, and when fit should be transplanted to the bottom of walls or other fences having a south aspect, or to the sides of slopes or ridges made for the purpose, over which a protection of mats supported on hoops may be formed. When the demand is such as to require greater security, recourse must be had to frames or pits. The first full supply in the open ground is best obtained by sowing under glass on a decayed hot-bed in the second week in October. When the plants come up they should be regularly thinned. Abundance of air should be admitted when the state of the weather will permit, and when mild the plants should be fully exposed, but the slightest frost should be guarded against. Very little water will be required; in fact the effects of damp are to be dreaded, and therefore every favourable opportunity should be taken for the admission of air, provided it is not saturated with moisture, unless when too low a temperature would render such a proceeding injudicious. A full exposure to air both night and day is necessary for some time previous to planting out in the open ground, which operation may take place in February, if the weather then

prove favourable. A reserve should be kept in the frames in case of severe frost occurring after the plantation has been made.

LEUCA'DIA. [SANTA MAURA.]

LEUCHTENBERG is a lordship in the kingdom of Bavaria, which has an area of 84 square miles, and a population of 5800 inhabitants. Till 1806 it was a landgraviate, the prince of which had a seat and vote in the Diet of the Empire. It is called after the antient mountain castle of Leuchtenberg, in the village of that name, the original seat of the landgraves. The male line becoming extinct in 1646, the country fell to Bavaria. In 1817 the late king of Bavaria, Maximilian Joseph, gave it, with the principality of Eichstädt (together 215 square miles, with 24,000 inhabitants) to his son-in-law Eugene Beauharnois, who assumed the title of duke of Leuchtenberg, and surrendered to the king of Bavaria the sum of five millions of francs, which the king of Naples was to pay him for his estates in that kingdom. The title of royal highness was conferred on the duke and his successors, according to the order of primogeniture, and the rank of princes and princesses of Leuchtenberg, with the title of serene highness, on the other members of the family. The dukes of Leuchtenberg were also declared capable of succeeding to the throne, in case the royal line of Bavaria should become extinct; and on the other hand, on the extinction of the male line of the house of Leuchtenberg, its possessions return to the crown of Bavaria, on the payment of an indemnity of 2,320,312 Rhenish florins to the female line. [EICHSTADT.]

LEUCIN, a name given by Braconnot to a substance obtained by the action of dilute sulphuric acid upon fibrin, which dissolves in it when greatly heated. The solution is to be mixed with twice its weight of water and boiled for nine hours; ammonia is thus formed, which combines with the sulphuric acid, and the other principles of the fibrin give rise to three different substances from which the leucin is obtained, in an insoluble state by precipitation with carbonate of lime and the subsequent action of alcohol, and other tedious operations. Leucin is white, pulverulent, very soluble in water and crystallizable. It is only slightly soluble in alcohol, and when boiling it dissolves more than it can retain on cooling. The crystals, when heated to above 212°, fuse and suffer partial decomposition and exhale an odour of roast meat; one portion sublimes without undergoing alteration, in the form of small crystalline grains, which are white and opaque; whilst another part is decomposed, and yields water, ammonia, and a little empyreumatic oil.

The aqueous solution of leucin is not precipitated by subacetate of lead, nor in general by any other metallic salt, except nitrate of mercury, which throws it down completely in the state of a white magma, while the supernatant liquor becomes of a rose-red colour. It has not been analyzed. With nitric acid it forms a curious compound, which Braconnot calls NITROLEUCIC ACID.

LEUCIPPUS, a Grecian philosopher, is generally regarded as the original propounder of what has been called the atomic philosophy. The time and place of his birth are unknown; he was the disciple of Zeno and the teacher of Democritus, and was born, according to Diogenes Laert. (ix. 30), either at Elis, Abdera, or in the island of Melos. None of his writings have come down to us, with the exception of a few fragments of a treatise 'On Mind,' which have been preserved by Stobæus. Some account of his philosophical doctrines is given by Diog. Laert., ix. 30; Aristotle, *De Anima*, i. 2; Plutarch, *De Placitis Philosoph.*, c. xvii., p. 883. E.; Cicero, *De Nat. Deor.*, i. 24; Lactantius, *Divin. Instit.*, iii. 17; *De Ira Dei*, c. 10; Fabricii *Bibliotheca Græca*, vol. ii., p. 658, 659, ed. Harles; Bayle's *Dict.*; and the articles ATOM and DEMOCRITUS in this work.

LEUCI'SCUS, a genus of fishes of the family *Cyprinidæ*, and section *Abdominales*. This genus, which was established by Klein, contains numerous species, of which the *Roach, Dace*, and *Bleak* afford familiar examples. The characters which distinguish them from others of the Cyprinidæ, or Carp tribe, consist in the comparative shortness of the dorsal and anal fins, and the want of strong spiny rays at the commencement of either, the simple lips, and deficiency of barbules about the mouth. The various species of Leuciscus are divided into two sections, according to the position of the dorsal fin. Firstly, those in which this fin is situated immediately above the ventral, as in the *Roach, Dace*, &c., and, secondly, those species in which the dorsal fin is placed above the space intervening between the ventrals and anal, as in the *Chub, Rud, Bleak*, &c.

The *Roach* (*Leuciscus rutilus*, Cuvier) is common in most parts of Europe, swims in large shoals, and frequents rivers, lakes, &c.; preferring somewhat still and deep waters, feeding upon worms and aquatic vegetables. It usually attains from twelve to fifteen inches in length. The length of the head, compared with the whole length of the fish, is as one to five; the depth, at the commencement of the dorsal fin, is to the body alone (without the head or tail) as two to five. The number of the fin-rays are—dorsal, 12; pectoral, 17; ventral, 9; anal, 13; and caudal, 19. The scales are large, and the number forming the lateral line is 43; the number of scales in the oblique line is 11; the colour of the back and upper part of the head is bluish-green or dusky green, becoming lighter on the sides of the body, and shaded into silvery white on the belly. The dorsal and caudal fins are dusky, tinged with red; the anal, pectoral, and ventral fins are bright red; the irides bright yellow.

The *Dace* (*Leuciscus vulgaris*, Cuvier) is more slender and elongated than the Roach; the scales are proportionately smaller; the mouth is more deeply cleft, and the eye is not so large. The length of the head compared with that of the head and body, not including the tail, is as two to nine; the depth of the body, compared to the whole length, is as one to five. The number of scales composing the lateral line is 52: there are eight scales in the oblique line above it, and below the lateral to the ventral fin there are four. The dorsal fin commences rather behind the middle of the body, whereas in the Roach it is exactly half way between the nose and the base of the tail fin. The colouring of the upper part of the head and back is dusky blue, becoming paler on the sides of the body, and shaded into silvery white on the belly. The dorsal and caudal fins are pale brown; the pectoral, ventral, and anal are almost white, but tinted with pale red. The fin-rays are: dorsal, 9; pectoral, 16; ventral, 9; anal, 10; and caudal, 19. The habits of the Dace are very similar to those of the Roach. It is found in Italy, France, and Germany, as well as our own country, generally frequenting the deep clear water of quiet streams. 'The Dobule' (*Leuciscus dobula*, Cuvier), says Mr. Yarrell, 'is found in the Oder, the Elbe, the Weser, and the Rhine, as well as in the smaller streams which run into them.' As yet however but one specimen has been found in this country, and was fortunately caught by the author of the 'History of British Fishes,' while fishing, in the month of August, 1831, in the Thames, below Woolwich. It is of a slender form, and the scales are of moderate size, fifty forming the lateral line, above which there are seven in an oblique line under the dorsal fin, and below the lateral line there are four. The length of the head, compared with that of the head and body alone, is as two to nine, and the depth of the body is equal to the length of the head. The dorsal fin commences about half-way between the anterior edge of the eye and the base of the tail fin. The colouring is the same as in the Dace, excepting that the pectoral, ventral, and anal fins are pale orange-red. In the number of the fin-rays it agrees with the Dace.

The *Graining* (*Leuciscus Lancastriensis*, Yarrell). Pennant appears to be the first author who noticed this fish, but its characters were never clearly defined until Mr. Yarrell's account appeared in the 'Transactions of the Linnæan Society,' vol. xvii., p. 7, pl. 2, fig. 1. M. Agassiz having examined the species when in England, immediately recognised it as an inhabitant of some of the lakes of Switzerland. In this country it appears to be chiefly, if not wholly, confined to the Mersey and some streams connected with that river, where it is met with in considerable abundance.

The adult Graining is from about seven to nine inches in length: the length of the head, compared to the whole length of the body and tail, is as one to six; and the depth of the body, compared to the whole length, as one to five: the nose is more rounded than in the *Dace*, the eye is rather larger; the pre-operculum is less angular, the dorsal line is less convex, and the scales are rather larger and wider. The dorsal fin commences exactly half way between the point of the nose and the base of the tail-fin. There are forty-eight scales in the lateral line, those in the oblique line from the dorsal fin to the lateral line are eight in

number, and below this line to the ventral fins there are four. The top of the head, the back, and upper part of the sides are of a pale drab colour tinged with bluish-red, separated from the lighter-coloured inferior parts by a well-defined boundary-line. The irides are yellowish-white; cheeks and gill covers shining silvery white, tinged with yellow; all the fins pale yellowish-white. The fin-rays are: dorsal, 9; pectoral, 17; ventral, 10; anal, 11; and caudal, 19.

The *Ide* (*Leuciscus idus*, Cuvier), a species which is found in Norway, Sweden, Denmark, Russia, and some other parts of Europe, is said to have been taken at the mouth of the Nith. Its form is somewhat bulky, compared with the other species here described. 'The head is large, and appears somewhat truncated; the muzzle blunt; the mouth small, without teeth, as is the case also with the other species of this extensive family; the upper jaw rather the longer; the eye of moderate size; the dorsal line convex; abdominal line almost straight; the scales of the body large; the lateral line curved in its descent from the upper edge of the operculum to the centre of the body. The fin-rays in number are: dorsal, 10; pectoral, 17; ventral, 11; anal, 13; caudal, 19; vertebræ, 41.

'In colour the irides are straw-yellow, the pupils black; forehead, nape, and back, very dark bluish-black; the sides bluish-grey; the belly white; pectoral fin orange; ventrals immediately under the dorsal fin, red in the middle, the first and last rays white; base of the anal fin white, the other part red; dorsal fin and tail grey; all the rays branched' (Yarrell.)

The *Chub* (*Leuciscus cephalus*, Flem.) is of a moderately elongated and thick form. The greatest depth of the body is contained four times and a half in the entire length, and the thickness is equal to two-thirds of the depth. The muzzle is somewhat obtuse, and the gape large. The scales are large; the number forming the lateral line is forty-four. Above this there are six scales in the oblique line to the dorsal fin; and below the lateral line there are three in the oblique line to the ventral fin. The dorsal fin commences half-way between the point of the nose and the base of the tail fin, and the ventral commences in the same vertical line as the dorsal. The fin rays are: dorsal, 10; pectoral, 16; ventral, 9; anal, 11; and caudal, 19. The colour of the upper parts is dusky green, the sides of the body and belly silvery-white; the lateral scales are dotted with black: on the cheeks and gill-covers there is a golden hue; the irides are very pale yellow; dorsal and caudal fins dusky; pectorals pale; anal and ventral fins tinged with red, with the exception of the two or three last rays.

The Chub is common in many of the rivers of this country, often frequenting holes near the roots of trees. It lives upon insects and worms, spawns in April and May, and rarely attains a weight exceeding five pounds.

The remaining species of Leuciscus belong to the second division; that is to say, they have the dorsal fin placed above the intervening space between the anals and the ventral.

The *Rud*, or *Red-Eye* (*Leuciscus erythrophthalmus*, Cuvier), somewhat resembles the Roach in form; its body however is higher and thicker, and is distinctly raised at the fore part of the dorsal fin, so as to form an obtuse angle. The greatest depth of the body is rather more than one-fourth of the entire length, and the head is one-fifth; the thickness is not half the depth. The snout is obtuse, and the mouth small, the lower jaws slightly exceeding the upper in length. The scales are large: the number contained in the lateral line is about forty. In an oblique line ascending to the dorsal fin there are seven, and below the lateral line to the ventral there are four. The dorsal fin commences half-way between the point of the nose and the end of the shorter tail-rays. The fin rays are—dorsal, 10; pectoral, 15, ventral, 9; anal, 13; caudal, 19. The upper parts are of an olivaceous colour, tinged with green and blue; the sides and the belly golden-orange; irides orange-red; dorsal and caudal fins dusky; pectorals pale; anal and ventrals tinged with red, excepting two or three of the last rays.

The Rud is found not uncommonly in rivers and other deep waters in various parts of England. Spawns in April or May, and feeds upon worms, mollusca, and vegetable substances.

The *Azurine* (*Leuciscus cæruleus*, Yarrell), a beautiful species, first described by Mr. Yarrell, from specimens received from Knowsley in Lancashire, approaches the Roach in shape, but is more tapered anteriorly and posteriorly, and is at once distinguished by its colour, which is slate-blue above and on the sides of the body, with the lower parts silvery-white, and by the position of the dorsal fin. This commences half-way between the eye and the end of the fleshy portion of the tail. The fins are white, the dorsal and caudal inclining to dusky. The greatest depth of the body is rather more than the entire length, and the head is equal to one-fifth of the length. The scales are rather large; the number contained in the lateral line is about forty-two. In an oblique line, from the dorsal fin to the lateral line, there are seven scales, and below the lateral line to the origin of the ventral there are three. The fin rays are—dorsal, 10; pectoral, 15; ventral, 9; anal, 12; and caudal, 19.

The only locality in England in which this fish is found is in the township of Knowsley. Mr. Yarrell however is informed by M. Agassiz that it is an inhabitant of some of the Swiss lakes.

The *Bleak* (*Leuciscus alburnus*, Cuv.) is of a more slender and elongated form than either of the preceding. The tail is very long and deeply forked. The greatest depth of the body is equal to one fifth of the entire length, and the greatest thickness is about half the depth: the lower part projects beyond the upper. The scales are of moderate size; the number contained in the lateral line being about forty-eight. The dorsal fin commences half way between the anterior edge of the eye and the end of the short central rays of the tail: the anal fin commences in a vertical line under the base of the last ray of the dorsal, and occupies half the space between its commencement and the base of the tail. The number of fin rays are—dorsal, 10; pectoral, 17; ventral, 9; anal, 18; caudal, 19. The general colour is silvery-white, which is shaded into an olivaceous green on the upper parts: all the fins are whitish; the irides are silvery.

The Bleak is a small species, rarely attaining eight inches in length, and is usually about six or seven inches long. It is common in many parts of Europe, as well as of this country, usually occurring in the same streams as the Roach and Dace, it swims in great shoals, and spawns in May. The position of the fin, and colour of the eye and fins, render it easy to distinguish the species from the Dace, when it approaches nearest in general appearance.

The *Minnow*, or *Minim* (*Leuciscus phoxinus*, Cuvier). This pretty little fish, a well known inhabitant of most of our running streams, appears to depart somewhat from the typical species of Leuciscus. Its form is slender and rounded, the greatest depth being about one fifth of the entire length, and the thickness equal to half the depth. The fins are proportionately large, especially the *dorsal*, *anal*, and *caudal*. The last is not very deeply forked, and has the extremities somewhat rounded. The dorsal fin commences about half way between the anterior edge of the eye and the end of the fleshy portion of the tail. The lateral line is straight from the tail to above the origin of the ventral fin, when it rises gradually to the upper edge of the operculum. The fin rays are—dorsal, 9; pectoral, 16; ventral, 8; anal, 9; and caudal, 19. The top of the head and back are of a dusky olive colour; the sides of the body are paler and mottled; the belly is white and of a fine rosy pink tint in the summer, varying in intensity according to the vigour of the fish; the irides and gill-covers are silvery; the dorsal fin is pale brown; the other fins are paler, excepting the tail, which is light brown, with a dark brown spot at the base of the rays.

LEUCITE, *Amphigene*, occurs imbedded in lava in trapezoidal crystals, and massive. Primary form a cube; cleavage parallel to the planes of the cube and the rhombic dodecahedron. Fracture conchoidal, undulating, shining. Hardness 5·5 to 6. Scratches glass with difficulty. Colour yellowish, greyish, or reddish white. Streak white. Lustre vitreous. Transparent, translucent, opaque. Specific gravity 2·483.

Massive variety amorphous, granular. Reduced to powder, it renders vegetable blues green: before the blow-pipe alone it is infusible; with borax difficultly forms a clear glass.

Analysis by Klaproth, from Vesuvius (No. 1), and by Arfwedson, from Albano (No. 2):—

	No. 1.	No. 2
Silica	53·75	56·10
Alumina	24·62	23·10
Potash	21·35	21·15
Oxide of iron	——	0·95
	99·72	101·30

LEUCO'MA, a white opacity of the cornea. [EYE.] It is the result of acute inflammation producing a deposition of lymph on the surface and in the layers of the cornea, either with or without ulceration of its substance. In those cases in which there is merely an effusion of lymph on the surface, or between the superficial layers of the membrane, it is often re-absorbed on the cessation of the inflammation, and the cornea recovers its transparency. But when the disease is more extensive and more deeply seated, the probability of recovery is far less, and many such cases are incurable by any means at present known. The most efficient mode of treatment is that with astringent lotions, such as a solution of nitrate of silver, in the proportion of from one to five grains to the ounce of distilled water.

LEUCON. [BOSPORUS.]

LEUCOSIANS. [OXYSTOMES.]

LEUCTRA. [EPAMINONDAS.]

LEUNCLA'VIUS, JOHN (the Latinized form of his real name, Loewenklau), was born in 1533, at Amelburn in Westphalia. He was one of the most distinguished scholars of his age; he was well acquainted with the Latin and Greek languages, the Roman law, and the writings of the fathers; and also with Turkish, which he learnt during his residence at Constantinople. He died at Vienna, 1593.

The most important of the works of Leunclavius are: editions of Zosimus, Procopius, &c., Basle, 1579; Manuel Palæologus, Basle, 1578; Dion Cassius, 1606; Xenophon, Basle, 1569, Par. 1622, 1625; John of Damascus, Basle, 1578; and many treatises of the fathers. He also wrote 'Commentatio de Moscorum bellis adversus finitimos Gestis,' in Pistorius's collection of Polish historians, 1655; 'Musulmanicæ Historiæ, libri xviii.' Frank. 1595; 'Annales Sultanorum Othomanidarum,' Frank. 1596, a translation from the German of Gaudier; 'Jus Græco-Romanum, tam Canonicum quam Civile,' Frank. 1596; 'Versio et Notæ ad Synopsim LX. Librorum Basilicon, seu universi juris Romani et ad Novellas imperatorum,' Basle, 1575, Leyden, 1617.

LEUSDEN, JOHN, was born at Utrecht in 1624. He studied the Oriental languages, and particularly Hebrew, with great success at the universities of Utrecht and Amsterdam. In 1649 he was appointed professor of Hebrew at Utrecht. He died in 1699. Leusden was one of the best Hebrew scholars of his age, though perhaps not equal to the Buxtorfs. Some of his works may still be consulted with advantage.

The most important of Leusden's works are: 'Philologus Hebræus,' Ut. 1656, 1672, 1659, Amst. 1686; 'Philologus Hebræo-Mixtus,' Ut. 1633, &c.; 'Philologus Hebræo-Græcus,' Ut. 1670, &c. These three volumes contain many curious discussions on the original languages of the Bible, the state of the Hebrew and Greek text, and that of the Septuagint, as well as considerable information on Jewish rites and antiquities. 'Jonas Illustratus,' Ut. 1656; 'Joel Explicatus,' &c, Ut. 1657; 'Scholia Syriaca,' 1658, 1672; 'Onomasticon Sacrum,' 1665; 'Clavis Hebraïca et Philologica Veteris Testamenti,' Ut. 1683, a useful book for beginners; 'Clavis Græca Novi Testamenti,' Ut. 1672; 'Compendium Græcum Novi Testamenti,' Ut. 1674, &c.; best edition 1762; 'Compendium Biblicum,' Ut. 1674, Halle, 1736; 'Novum Testamentum Græcum,' Ut. 1675. He also wrote the Preface and Introductions to Athias's 'Hebrew Bible,' Amst. 1661, 1667, and edited Pool's 'Synopsis Criticorum' (1684), and the works of Lightfoot (1699) and Bochart (1675, 1692). He published several Manuals of Hebrew Grammar, which however are almost entirely taken from Buxtorf. He had commenced an edition of the Syriac version of the New Testament, which was published after his death by Schaaf, Leyd. 1708.

LEUWENHOEK, or LEEUWENHOEK, ANTHONY VAN, was born at Delft, in Holland, in 1632, and does not seem to have had the advantage of a learned education. The skill which he possessed in grinding glasses for microscopes first brought him into notice, and his microscopes were said even to excel those of the celebrated Eustachio Divini. He did not confine his attention however to the mechanical construction of instruments, but made many researches on the minute structure and composition of various animal fluids and solid textures, and he acquired great fame as an anatomist and physiologist. Dr. De Graaf introduced him to the notice of the Royal Society of London, and the greater number of his discoveries and researches were published in the 'Philosophical Transactions' of that body. His first communication was transmitted to the Royal Society by De Graaf in 1673. His contributions to the 'Philosophical Transactions' became afterwards numerous and important, and amounted altogether to about 112 papers, which are included between No. 94 and No. 380 of that work. In 1680 he was chosen a Fellow of the Royal Society, and he was made a corresponding member of the Academy of Sciences at Paris in 1697. He appears to have passed the whole of his life at his native place, devoting his time to microscopic researches, chiefly relating to anatomy; and the success which attended his observations is said to have principally arisen from his having paid the most minute attention to the grinding and polishing of single lenses, which he always used in preference to the compound microscope.

The subjects of Leuwenhoek's labours were so numerous, that we can only briefly mention some of the most important of them. Some of the antagonists of Harvey objected to his doctrine of the circulation of the blood, on the ground that if the blood passed directly from the arteries into the veins it could not nourish the parts through which it flowed. This question was undecided, when Leuwenhoek communicated a memoir to the Royal Society, in which he stated, as the result of his experiments, that, contrary to the opinion of Harvey, the passage of the blood was not immediate from the arteries into the veins. However in 1690, having very carefully re-examined the course of the circulation through the minute vessels of a part with a more perfect microscope, he discovered and clearly demonstrated that the arteries and veins are continuous. He even refused to admit that there is any division between the arterial and venous capillaries, because he said that it is impossible to determine where arteries terminate or veins begin. The latest investigations have proved the conclusions of this great microscopist to be nearly correct; for though the transit of the blood from arteries to veins can be observed by means of the microscope in many transparent parts, as the web of the frog's foot, yet the nature of the minute or capillary vessels through which the communication is effected is little understood. 'They form a dense net-work of extremely minute tubes, in which the arteries seem to terminate and the veins to arise; for their delicacy prevents the possibility of discovering any such structure as could decide to which set of vessels they belong; and indeed it is only by observing that the currents of blood-globules pass in regular directions, that we can prove that they are canals with definite membranous walls.' [HEART, vol. xii. p. 82.]

At the time when Leuwenhoek made these observations, the chemical doctrines reigned in medicine, and all the processes in the animal economy were explained by chemical changes: the blood was said to undergo the process of fermentation. Leuwenhoek triumphantly opposed this hypothesis, objecting to it that if fermentation took place bubbles of air would be generated in the vessels, which could never be observed. He also directed his attention to the form of the globules of the blood, which Malpighi had already discovered. Leuwenhoek stated that they are oval and flattened, and that each is composed of six exceedingly minute conical particles, which separately do not reflect the red colour, but which by their union communicate to the blood the physical properties which it presents. This theory served as the basis of that of Boerhaave on inflammation. Leuwenhoek stated, in proof of his hypothesis, that the red capillary vessels divide into smaller branches, in which the circulation is beyond the influence of the heart, and where the blood appears white because its globules are divided so as to accommodate themselves to the size of the canals through which they pass. Late experiments have shown the fallacy of these ideas on the blood.

The brain and nerves were also the subjects of his researches. He described the cortical substance as being entirely vascular, and said that the vessels which compose it are 512 times smaller than the minutest capillaries, and that the globules which compose the fluid contained in these vessels are 36 times more minute than those which form

the red blood. Fresh experiments made him change his opinions, and in 1717 he showed that the brain and nerves are fibrous structures, and that the blood-vessels glide between the fibres which compose these tissues. These observations very nearly agree with those of modern anatomists as to the structure of the brain; the only part in which Leuwenhoek seems to have been deficient was in a clear knowledge of the difference of structure between the cortical or grey and the medullary or white parts of the brain. Thus when he discovered that the latter was fibrous he supposed that the former must be so also; whereas the cortical substance is composed almost entirely of blood-vessels connected by exceedingly fine cellular membrane, as first stated by Leuwenhoek, and investing, as has been since ascertained by Valentin, small grey globules or granules. It is now universally agreed that the medullary part of the brain is composed of fibres.

Leuwenhoek examined the structure of the crystalline lens, and described with exactness the disposition of the layers which compose this part of the organ of vision; and he embellished his description with several very good figures.

Much has been said concerning his investigation of the well-known and celebrated spermatic animalcules, which since the time of their first discovery in 1677 have excited the curiosity and speculative fancy of many naturalists. Haller states that Ludwig Hamm (a student at Leyden) was the first discoverer of the seminal animalcules, in August, 1677. Leuwenhoek claimed the merit of having made the discovery in the November of the same year; and in 1678 Hartsœker published an account of them, in which he professed to have seen them as early as 1674. A great deal has since been written upon them; Needman, Buffon, Der Gleichen, Spallanzani, Prevost and Dumas (their experiments were made together), and Wagner, may be mentioned as those who have devoted most attention to these curious little animals. Leuwenhoek minutely described them, and fancied that when they arrived in the uterus they irritated this organ, attracted the ovum, and communicated life to the embryo which it contained. He also held the animalculæ to be of different sexes, and according as one or other gained the ovum during fecundation, it determined the sex of the offspring. Such notions as these require no refutation. The details of his observations on this subject will be found in Buffon's 'Histoire Naturelle.'

Leuwenhoek would have made both more numerous and more valuable discoveries, if he had possessed greater erudition, which would have enlarged his ideas, and prevented him from mistaking, as he did in some instances, probabilities for facts. Thus he often fancied that he saw what did not exist, and afterwards he persisted in his error. Among other mistakes he considered that the villous or mucous coat of the intestines was muscular; he also maintained that pulsation belonged to veins, and not to arteries.

Leuwenhoek's reputation was very extensive When Queen Mary was in Holland, she paid him a visit, and she was highly delighted with his curiosities. He presented her with two of his microscopes. When the Czar Peter the Great was passing through Delft in 1698, he sent two of his attendants to request Leuwenhoek to pay him a visit, and to bring his microscope with him. The philosopher, after having shown his instruments to the emperor, exhibited to him the curious phenomenon of the circulation of the blood in the tail of an eel.

Leuwenhoek died at Delft in 1723. Besides his contributions to the 'Philosophical Transactions,' he published about 26 papers in the 'Memoirs of the Academy of Sciences.' His writings were collected and published separately in Dutch at Delft and Leyden; they were also translated for him into Latin, and printed at Delft, in 4 vols. 4to., in 1695-99. An English translation was made from the Dutch and Latin editions in 1798-1800, by Mr. Samuel Hoole, in 4to. At his death he bequeathed to the Royal Society of London a small Indian cabinet, in the drawers of which were contained thirteen little boxes or cases, each holding two microscopes handsomely mounted with silver, of which not only the lenses but the whole apparatus were made with his own hands; each microscope had an object placed before it, of which there was an accompanying drawing made by himself. (*Philosophical Transactions* for 1723; *Biogrophie Universelle*, &c.)

LEUZE. [HAINAULT.]

LEVA'NT, LEVA'NTE, an Italian word which means the East, and which is also commonly used, especially among seafaring and commercial people of the countries bordering on the Mediterranean, to designate the eastern or Asiatic shores of that sea, namely, those of Syria and Asia Minor, the harbours of which are styled 'Scale di Levante,' in French 'Echelles du Levant' ('stairs of the East'). Smyrna, Alexandretta, Beyrout, Acre, the harbours of Cyprus and other islands near the coast of Asia, are included within this denomination. The inhabitants of those countries, and more particularly that mixed population which is found in the seaport towns, the descendants of Europeans settled there, and of Greek, Armenian, or Syrian mothers, are called by the Italians 'Levantini,' and Lévantins by the French. The Levantines, or Franks, as they are also called, are distinguished from the Greek rayahs, or subjects of the Porte, as most of them claim the protection of some European consul. They speak Greek among themselves, but their medium of intercourse with European seamen and traders is a very corrupt Italian mixed up with modern Greek words, which is known by the name of 'Lingua Franca.' French is the language of refined society. The Levantines, at least the better sort of them, are a mild, easy-tempered, and sociable people, deficient in spirit and instruction, without strong feelings or passions, and having no distinct national character. Their women are generally handsome. The Levantine or Frank population of Smyrna amounts to five or six thousand; most of them are of the Latin or Roman church. (Macfarlane, *Constantinople in* 1828, &c., ch. v.)

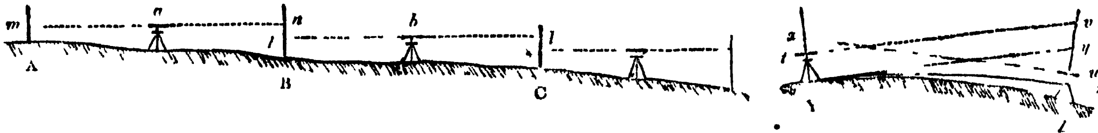
LEVANTI'NA, VAL, *Livinen Thal* in German. [TICINO, CANTON OF.]

LEVELLING is the art of determining the heights or depressions of points on the ground with respect to a spherical or spheroidal surface coinciding nearly with that of the earth, or, when the extent of ground is inconsiderable, with respect to a horizontal plane passing througl some given point on the ground.

In those extensive operations of this nature which are connected with the researches of physical astronomy an attention to that figure of the earth which approaches the nearest to the truth is of importance; but when the object is merely to determine the profile of the ground for a canal or a line of road, it is sufficient to consider the surface to which the points are referred as that of a sphere.

The relative heights of a series of points on the ground are obtained by means of their vertical distances from others which, on the supposition of the earth being a sphere, are equally distant from its centre; and these, which are called level-points, must be found by an instrument constructed for the purpose. Now a plane being supposed to touch the earth at any given point, all the points in the circumference of a circle described on that plane, about the point of contact as a centre, will be level-points: consequently, if a telescope be so adjusted that, when turned round upon the vertical axis of the instrument to which it is applied, its line of collimation (that which passes through the centres of all the lenses) may remain parallel to the horizon, any number of such level-points will be determined, if, being at equal distances from the said axis, they are in the direction of the line of collimation produced. The instrument alluded to is called a spirit-level [SPIRIT LEVEL; THEODOLITE]; and by certain adjusting screws the line of collimation, or optical axis of its telescope, is capable of being brought into the position above mentioned, which is indicated by a bubble of air remaining, during a complete revolution of the telescope, in the middle of the tube containing the water or spirit.

The instrument is employed for the purpose of ascertaining the relative heights of points on the ground in either of the following ways, the first of which is the most simple, and is frequently adopted. Choice is made of any convenient stations, A, B, &c., on the line of operation, and the distances between them are determined either by actual admeasurement or by computations founded on the data afforded by a previous survey of the ground. The instrument is then set up at or near the middle of the interval between every two such points in succession. When the telescope thus placed, as at *a*, has been rendered horizontal by means of the adjusting screws, an assistant at each of the stations A and B, holding what is called a station staff in a vertical position, moves a vane or index along the staff, upwards or downwards, according to the directions of the observer at the telescope, till it appears to coincide with the intersection of two wires in the telescope, that intersection having, by the adjustment of the instrument, been made to coincide with the optical axis, or line of collimation



The points thus determined on the staves are represented by m and n; and, from what has been said, these are level-points, or points equally distant from the centre of the earth. Therefore the heights Am and Bn being read on the graduated staves, the difference between them will give the relative heights of the ground at A and B; that point, of course, being the highest at which the distance of the vane from the ground is the least. A similar process is repeated with respect to the points B and C, the instrument being placed at b, midway between them, and the operation is to be continued to the end of the line on which the profile is required. It is customary to insert the heights Bn, Cq, &c., in a column headed *Fore sights*, in a sort of field book, and the heights Am, Bp, &c., in a collateral column headed *Back-sights*. The difference between the sums of the numbers in these two columns will be equal to the height of one extremity of the line above the other.

But it is very generally the practice, with the view of diminishing the risk of error arising from the imperfection of the instrument, to execute a sort of double levelling. This consists in placing the spirit level successively at each of the two stations, as Y and Z, and having, by the screws, adjusted the telescope as before, let tr be the horizontal line at Y, and wx that at Z; then, the heights Zv and Yr being obtained by means of the staff set up successively at each opposite station, it may be easily proved that half the difference between them will be equal to the height of the ground at one point, as Y, above that at the other. This is however strictly correct only when the staves at Y and Z are considered as parallel to one another; but the error arising from their being in the direction of the earth's radii is quite insensible in any of the ordinary operations of this nature.

In using either of these methods therefore no correction on account of the earth's curvature is necessary; but when, from any circumstances, the spirit level cannot be placed nearly mid way between every two stations, and particularly when it can be placed only at one station, as Y, the difference between the height Zv of the visual ray at one station, and Yt, the height of the instrument at the other, will not, on account of the earth's curvature, be the correct relative heights of the ground at the two stations. For, let Yz be an arc of the earth's surface, supposed to be spherical, let also Yt, Zv be in the direction of its radii, and let Yy be a tangent to the curve at Y: then tv being parallel to Yy, the difference between Zv and Yt, or zy (which may be considered as equal to Yt), will be Zy, the apparent height of Y above Z, whereas the true height should be Zz. Now from the known magnitude of the earth, the distance yz between the tangent Yy and the arc, can easily be computed when Yz or YZ is of any given length. If this length is equal to 100 yards, we shall have $yz = 0.62$ inches. Consequently, in a series of operations carried on in the manner above described, with station lines not exceeding 100 yards in length, the error in the relative heights at the end of one mile would be little more than one third of an inch.

On ascending or descending a steep hill, no other method can be adopted than that of placing the instrument at one extremity of the station line and the staff at the other; but as these lines are then necessarily very short, the deviation above mentioned need not be regarded.

In the determination, on uneven ground, of the length of a base line for the trigonometrical survey of a country, the relative heights of the ground, as at A, B, C, &c., when found as above, serve for the reduction of the measured hypothenusal lines AB, BC, &c., to the corresponding horizontal lines mn, pq, &c.; these being comparatively short are then considered as circular arcs, and each is separately reduced to an arc of the earth's surface at the level of the neighbouring seas by subtracting from it the term $A\frac{h}{r}$, which is found from the proportion between the arcs and radii in the similar sectors. Here A is the horizontal line or arc as mn; r is the radius of the earth's curvature at the level of the sea, and h is the height of the ground at A, B, &c., above that level.

The profile of the ground is usually expressed on paper, in portions of any convenient length, for the purpose of enabling the engineer to determine the depths of his excavations, or the heights of the masses of earth to be raised, when it is proposed to execute a canal or road. A right line being drawn to represent one parallel to the horizon, and passing through the highest or the lowest point of the natural ground, the heights or depressions of the remarkable points, as A, B, &c., with respect to such line, are obtained by additions or subtractions from the numbers in the field-book, and are, by a proper scale, set out from that line on others drawn perpendicularly to it at intervals equal to the horizontal distances between the same points. The series of points thus obtained, being joined by hand or otherwise, give the figure of the required vertical section of the ground. In general, for the sake of distinctness, the scale by which the heights are set out is greater than that of the horizontal distances between the points.

When the difference of level only between two places is required, a rectilinear direction from one to the other is not necessarily that in which it is most convenient to perform the operation: a circuitous route is preferable when it presents fewer impediments from woods or marshes, or when the inequalities of the ground are of less magnitude.

Among the operations of levelling, which, within a few years, have been performed on an extensive scale, may be mentioned the series of levels taken across the lands between the Black and the Caspian seas; and between the latter and the lake Aral, for the purpose of determining the relative heights of those waters: the series which, during the expedition of Colonel Chesney, were taken from Iskenderun on the Mediterranean to Bir-ehjik on the Euphrates, and near the Persian Gulf, between the latter river and the Tigris. To these may be added the extensive lines levelled in England and on the Continent for the several railways which have been executed or are in progress; and the important work now being carried on, under the auspices of the British Association, in order to determine the difference between the levels of the waters in the English and Bristol channels.

LEVEN, LOCH. [KINROSS-SHIRE.]

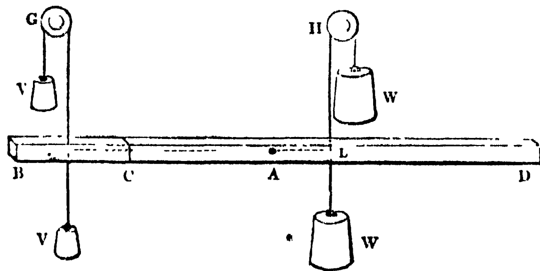
LEVER (*levare*, to lift up), the name of a common mechanical instrument, consisting of a simple bar of wood or metal, by fixing one point of which, called the fulcrum, a pressure at the end more distant from the fulcrum is made to counterbalance a larger pressure at the nearer end; or if both ends be equally distant from the fulcrum, equal pressures are made to balance each other.

The lever, considered as a machine, would require no further notice than a reference to the article POWER for the correction of a mistake incident to the conception of this and other machines. But as one of the fundamental principles of mechanics receives its most simple form in its application to the common lever, this instrument assumes a degree of theoretical importance which will justify some discussion of the subject; and the principle of the lever, which is often confounded with the lever itself, must be explained. Thus when it is said in popular writings on mechanics that all machines are reducible to the lever and the inclined plane (an assumption of a startling character if we consider, for instance, the works of a common watch) it is meant that every mode of communicating or relieving pressure is explicable upon the principle of one or other of those machines.

The first explanation of the lever was given by ARCHIMEDES, and that in so simple a manner, that while his method has always been the best for a popular view of the subject, it has never been surpassed, or even equalled, in rigour or purity, considered as a foundation for the science of STATICS.

It assumes two principles; firstly, that when a system is in equilibrium, the state of rest will not be disturbed if addi-

tional pressures, such as compensate each other, and would by themselves produce no motion, be introduced or removed; secondly, that when a weight is made to rest by being attached to an immoveable point (say it is suspended by a string), the point or pivot of suspension undergoes a pressure equal to the weight of the system, whatever may be the form of that system, or the dispositions of its parts. Every science must be founded upon some axiomatic assumption: and perhaps there is none which is better entitled to preference than the fact that a given weight, say a pound, suspended by a string, exerts the same pressure on the string whatever its shape may be; namely, a pressure equal to the weight of the body. This being premised, a



cylindrical or prismatic bar of uniform material will necessarily rest if a pivot be passed through its middle section at A: since there is no reason why it should preponderate on either side. Divide the bar into two parts, B C and C D, of which K and L are the middle points. At K and L suspend weights equal to the weights of B C and C D; but at the same time apply counterpoises of equal weight acting over fixed pullies G and H: so that the new forces being such that each pair would be in equilibrium, they will not affect the equilibrium already established by means of the equality of the parts of the bar on each side of A. Now, equilibrium existing, we are at liberty to remove any forces which equilibrate each other, such as are the upper V and the weight of B C: such also as are the upper W and the weight of C D. For B C, if detached, would exert on the string which goes over the pulley G a pressure neither more nor less than its own weight (which is V); and C D, if detached from the pivot and from B C, would exert on the string of the pulley H a pressure equal to its own weight, or to W. But when these pairs are removed, there remain only the lower weights V and W; the substance and rigidity of the lever being retained to connect them, though its weight is removed or counterpoised. And K L, being the sum of the halves of the parts, is equal to half of the whole length, or to B A: take away the common part A K, and there remains B K, equal to A L, or K C equal to A L; also A K is equal to C L. Also V is to W in the proportion of B C to C D, or of K C to C L, or of A L to A K; that is, the weights V and W balance each other when they are inversely as their distances from the fulcrum A.

It only remains to show that no other weight except V, proportioned to W as above, will counterbalance W. If possible, let another weight, V′, produce this effect when applied at K: and upwards, by means of the pulleys H and G, apply pressures equal to W and V′, the old weights V and W remaining as before. Then there are two systems which being separately in equilibrium are so when existing in connexion. But the under and upper W balance each other; remove them, and there remain two unequal pressures, V and V′, which, acting in opposite directions at the same point K, balance each other: a manifest absurdity. Consequently, no other weight except V can balance W when placed at K.

The most simple way in which the preceding result can be stated is as follows: when V placed at K balances W placed at L, about the pivot A, the number of *pounds* in V

K A L

multiplied by the number of *feet* in K A gives the same product as the number of pounds in W multiplied by the number of feet in A L; (any other units of weight and length will do equally well, if only the same be used in both). The product of a pressure and the perpendicular let fall upon its direction from a fixed pivot or fulcrum is sometimes called the moment, sometimes the leverage, of the weight.

As the pressure on the pivot A is the sum of the weights V and W, if the lever were suspended at A, by a string passing over a pulley, a counterpoise might be applied in the shape of a weight equal to the sum of the weights V and W. But when a system is at rest, the equilibrium is not disturbed by making any point an immoveable pivot, and taking away any weight which may be there, leaving its place to be supplied by the reaction of the pivot. If then we were to make K a pivot, weights equal to W and V + W, acting downwards and upwards at L and A, would counterbalance one another, and since V × K A = W × L A, add W × K A to both sides, and we have (V + W) K A = W × K L.

In English treatises on mechanics, it is customary to call one of the pressures which balance on a lever, the power, and the other the weight. Levers are thus distinguished as of the first, second, or third kind, according as the fulcrum, the weight, or the power, is in the middle.

LEVERIDGE, RICHARD, a celebrated singer towards the end of the 17th and beginning of the 18th centuries, for whom Purcell wrote most of his base songs. He was in much request in all convivial parties, and as he possessed a talent for lyrical poetry as well as for musical composition, several of the songs by which he delighted his audiences where wholly the offspring of his own genius. Among these Dr. Burney mentions 'Ghosts of every occupation,' which he had heard performed by the bard himself. But we introduce his name here chiefly on account of his having set the music to Gay's 'Black-eyed Susan,' an air which, for tenderness, beauty, and fitness, has few rivals, and is one of the many that prove, to every candid mind, the English talent for music, though it is generally denied by foreigners, whose opinion on the subject long has been, and continues to be, adopted by what is called the fashionable world in this country. During his life, Leveridge published several of his songs, in two 8vo. volumes; and, though far from abstemious, he reached the advanced age of 88 years, dying in 1758.

LEVITE. [JEWS.]

LEVYNE occurs crystallized; primary form an acute rhomboid: cleavage parallel to its planes. Fracture conchoidal. Hardness 4·0. Scratches carbonate of lime. Colour and streak white. Lustre vitreous. Translucent. Specific gravity 2·15. When heated, yields water and becomes opaque; swells up when heated in charcoal; with phosphoric salt gives a transparent globule, which contains a nucleus of silica, and becomes opaque on cooling. It is suspected to be merely a variety of chabasie. It is found in Ireland, Faroe, and some other places.

Analysis by Berzelius:—

Silica	48·00
Alumina	20·00
Lime	8·35
Soda	2·75
Potash	0·41
Magnesia	0·40
Water	19·30
	99·21

LEWES, a market-town and parliamentary borough in the hundred of Lewes and county of Sussex, of which it is considered to be the capital, is 49 miles south-by-east from London. It is situated partly on the level bank of the Ouse, but the greater part of the town is on the right bank of the river, and on one of the elevated masses of chalk which compose the South Downs. The town is of Saxon origin, and had acquired its present name some centuries prior to the Norman conquest. According to Camden, 'Lewes' is derived from Leswes, a Saxon word denoting pastures.

The streets are well built, paved, and lighted with gas. The principal public buildings are the churches, the assize-hall, and the house of correction. The last was erected in 1793, and enlarged in 1817. It is built on the plan suggested by Mr. Howard, and contains between seventy and eighty capacious cells, of which fifteen are solitary. The assize-hall was erected in 1812, at an expense of 15,000*l.* It is 90 feet long and about the same in width, and comprises a council chamber, the civil and criminal courts, record rooms, and other convenient apartments.

Lewes is not incorporated. The management of the affairs of the borough is entrusted to two constables and two headboroughs, who are elected annually by the bur-

gesses, and who are subject to the jurisdiction of the county magistrates. The summer and winter assizes are held here, and likewise the general quarter-sessions for the eastern division of the shire. The borough has returned two members to parliament continuously from the reign of Edward I. The trade in wool was formerly extensive; but it is said to have declined, and grain and malt, sheep and cattle, are now the principal articles of traffic. The maritime trade of the town is carried on through Newhaven at the mouth of the Ouse, about eight miles below Lewes. The fairs for cattle are held May 8 and the beginning of June; those for sheep on Sept. 21 and October 2. The average number of sheep sold annually at these fairs is estimated to exceed 100,000. The ecclesiastical livings are four rectories in the diocese of Chichester, and of the respective net annual values of 206*l*., 250*l*., 116*l*., and 190*l*. The last two are in the patronage of the crown. The population of the borough in 1831 was 8592.

The free grammar-school of Lewes and Southover was originally founded and endowed by Agnes Morley in 1512. There are usually twelve free scholars, children of the burgesses of Lewes, who receive gratuitous instruction in the classics, writing, arithmetic, &c., and are prepared for entering the universities. There is also an exhibition, founded by George Steers in the year 1800, for the children of the inhabitants, at either of the universities. It is tenable during four years, and in 1819 amounted to 35*l*. The school-house is a large and convenient building, and in good repair. The master resides in the school-house, and receives from the funds of the charity about 90*l*. annually. During several years preceding 1819 the free scholars had been presented by Lords Chichester and Hampden. The castle, which stands upon a cliff, is supposed to have been built in the reign of William the Conqueror. Large quantities of Roman coin have been found here at different times, which renders it probable that Lewes was once a Roman station; but for an account of the antiquities, which are numerous, both in the town and suburbs, the reader is referred to Lee's 'History of Lewes and Brighthelmstone,' 1795.

(*First Report of the Commissioners on the Education of the Poor*, 1819; *Boundary Reports*; Lee's *History*, &c.)

LEWIS, Kings of France. [LOUIS.]

LEWIS. [ROSS SHIRE.]

LEWISHAM. [KENT.]

LEX. [LAW.]

LEX MERCATO'RIA, or LAW-MERCHANT, in a general sense, denotes that body of the usages and customs of merchants which, having been adopted into the laws of most countries, and particularly of maritime states, for the protection and encouragement of trade, has been termed a branch of the Law of Nations. (Blackstone's *Commentaries*, vol. iv., p. 67.) In this general signification of the term, the law-merchant is at the present day extremely uncertain and indefinite, as different countries have adopted different portions of it, and the mercantile usages and customs common to all are few in number. Some centuries ago however, when the transactions of commerce were less complicated, and the rules by which they were governed were consequently simple, the provisions of the Lex Mercatoria appear to have been better understood and ascertained. Thus we find the law-merchant frequently referred to in general terms by our earlier English statutes and charters as a well-known system, and distinguished from the ordinary law; as, for instance, in the stat. 27 Edw. III., 1353, it is declared 'that all merchants coming to the Staple shall be ordered according to the law-merchant, and not according to the common law of the land;' and the Charta Mercatoria, 31 Edw. I., 1304, directs the king's bailiffs, ministers, &c., 'to do speedy justice to merchants *secundum legem Mercatoriam*.'

Lord Coke mentions the law-merchant as one of the great divisions of which the law of England is composed (*Co. Litt.*, 11. b.), and the custom of merchants is said to be part of the law of England of which the courts are to take judicial notice. (*Vanheath* v. *Turner*, Winch's *Reports*, p. 24.) This however must be understood to apply only to general customs, as the rule does not comprehend particular or local usages which do not form part of any general system. The generality of the expression has caused much misunderstanding, and merchants in this country have been often led to conceive from it, that when practices or rules of trade have become established amongst them so as to amount to 'customs' in the common meaning of the term, they form part of the law of the land. This misconception has frequently led to improper verdicts of juries in mercantile trials. It is quite clear however that the Lex Mercatoria, when used with reference to English law, like the Lex et Consuetudo Parliamenti, merely describes a general head or division of the system. What customs or rules are comprehended under that division must always be matter of law for the consideration of the judges; and it is said by Chief-Justice Hobart, in the case of *Vanheath* v. *Turner* above cited, that if they doubt about it, they may 'send for the merchants to know their custom, as they may send for the civilians to know their law.' The principle seems to be as alluded to by Lord Hale in a case in Hardres's *Reports*, p. 486, that the courts are bound to take notice of the general law of merchants; but that, as they cannot know all the customs which form part of that law, they may inform themselves by directing an issue or making inquiry in some less formal manner. The latter mode has not unfrequently been adopted in modern times, and evidence of mercantile customs has sometimes been given before juries. (1 Douglas's *Reports*, p. 654; 1 Bingham's *Reports*, p. 61.)

LEXICON. [DICTIONARY.]

LEXINGTON. [MASSACHUSETTS.]

LEYBOURN, WILLIAM, a mathematician of the seventeenth century. The date of his birth is unknown, but Dr. Hutton supposes his death to have happened about the year 1690. He was originally a printer in London, and published several of the works of Samuel Foster, the Gresham professor of astronomy. Subsequently he became an author himself, and appears to have attained to considerable eminence as a practical mathematician. Among his published works are:—'Arithmetic,' 1619; 'The Art of Numbering with Napier's Bones,' 1667; 'Complete Surveyor,' 1653; 'Geometrical Exercises,' 1669; 'Art of Dialling,' 1687; 'Mathematical Recreations,' 1694; 'Panarithmalogia, or Trader's Guide,' 1693; 'Cursus Mathematicus,' comprising Arithmetic, Geometry, Cosmography, Astronomy, Navigation, and Trigonometry, fol., 1690. He also edited the works of Gunter.

(Chalmers's *Biographical Dict.*; Granger's *Biog. Hist.*; Watt's *Bibliotheca Brit.*)

LEYCESTE'RIA, a genus of plants of the natural family of Rubiaceæ, named after the late W. Leycester, Esq., of the Bengal Civil Service, who paid much attention to horticulture in India. The genus consists of only a single species *L. formosa*, a native of the Himalaya mountains, at elevations of from 6000 to 7000 and 8000 feet, in Nepal and Sirmore, where it grows among oaks and pines, and is therefore well suited to the climate of England, where indeed it may be seen growing in great luxuriance in some gardens, and showing that many others from the same situations are equally suitable to this climate, which is not the case with many shrubby rubiaceous plants. It forms a large and very showy shrub with numerous luxuriant smooth and cylindric fistulous shoots issuing from the root, which are of a purplish colour. The leaves are opposite, ovate-lanceolate, and glaucous; the flowers white with a tinge of purple, arranged in drooping racemes which are furnished with coloured foliaceous bracts.

LEYDEN, a city of the kingdom of the Netherlands, in the province of South Holland, in 52° 9′ 30″ N. lat. and 4° 29′ 13″ E. long. It is, in point of size, the fourth city in the kingdom of the Netherlands, and its population amounts to 36,000. Leyden is pleasantly situated in a level part of the country, on both sides of a branch of the Rhine, and traversed by many broad canals, bordered with trees, which, intersecting each other, divide the town into fifty small islands, connected together by 145 bridges, some of which are of wood. It is surrounded with a rampart, partly covered with turf and partly faced with brick, on which are fine shady walks; and outside there is a deep and broad moat, with eight bridges leading to so many gates. The city is well built, and the principal streets are broad and well paved. That in which the town-hall is situated extends nearly across the city from east to west; it is almost two miles in length, and is reckoned one of the handsomest streets in Europe. The houses are mostly of brick, with the gable-ends to the streets, as usual in many Dutch and German cities. Among the public buildings the most worthy of notice are the town-hall, a magnificent edifice, containing a valuable collection of paintings;

St. Peter's church, the finest of the seventeen in the city, a large and handsome Gothic building, which contains the sarcophagus of Boerhaave and the monuments of Peter Camper, Meermann, and Luzac, who lost their lives in the explosion in 1807. An ancient castle or fort, ascribed by tradition to the Romans, is in the middle of the city, and, rising above the highest houses, commands an extensive prospect of the town and the surrounding country. The handsome new Roman Catholic church, the custom-house, and hospitals likewise deserve notice. The manufactures of linen and woollens were formerly celebrated, and the chief source of wealth to the inhabitants, but they have greatly declined. It is however still the chief seat of the woollen manufactures and of the wool trade of Holland, and has an annual fair, which is much frequented. There are likewise extensive manufactures of soap and indigo, tanneries famous for their shamoy leather and parchment, salt-works, &c. Printing, especially of classical books, was formerly a great branch of trade, but is much reduced. The most remarkable event in the history of Leyden is the siege by the Spaniards in 1573, which it successfully resisted, though 6000 of the inhabitants perished by famine and pestilence. To reward the valour of the citizens, an offer was made them, either of an exemption from taxes for a certain number of years, or of the foundation of a university. They chose the latter. It was founded accordingly in 1575, and has acquired great and deserved reputation throughout Europe. It has a library of 60,000 volumes and 14,000 manuscripts, a valuable botanical garden, an observatory, a museum particularly rich in Egyptian and Etruscan antiquities, a cabinet of natural history, &c. &c. The number of students is now nearly 800. There are likewise many fine private libraries and museums, and various learned societies. In 1655, 4000 of the inhabitants were carried off by the plague; and in 1807 a boat, with 40,000 lbs. of gunpowder on board, blew up, and destroyed a large portion of the finest part of the city: several hundred persons lost their lives on that occasion.

Leyden was the birth-place of Heinsius, Salmasius, Van Swieten, Paul Rembrandt, Peter Muschenbroek, and the notorious John Bockolt the tailor, who in 1534 proclaimed himself chief of the Baptists and king of Münster.

LEYDEN PHIAL. [ELECTRICITY.]

LEYDEN, LUCAS VAN (whose proper name was L. Jacobs), called by the Italians Luca d'Ollanda, was born at Leyden in 1634. He was taught painting by his father, Hugh Jacobs, and afterwards by Cornelius Engelbrecht, a scholar of Van Eyck. He was remarkable for precocity of talent, for he began to engrave on copper when only nine years of age, and had distinguished himself both as a painter and engraver long before he attained the age of manhood. 'With fewer faults than his contemporaries,' says Fuseli, 'he possessed qualities to them unknown, more freshness and mellowness of colour, more aërial perspective, and equal dexterity in oil, distemper, and on glass. He delighted in subjects of extensive composition, though ignorant of light and shade in masses. His forms, like those of Albert Durer, are implicit copies of the model, but with less variety and less intelligence, lank, meagre, ignoble.' Other critics are more favourable to this artist, of whose works there are many at Leyden, Amsterdam, Paris, Vienna, Dresden, Munich, Florence, &c., but genuine undamaged pictures by him are very rare. His most celebrated work, a large picture of the Day of Judgment, is in the town-hall of Leyden. His drawings are highly prized, and almost as rare as his paintings. His fame now chiefly rests on his numerous engravings, which are equally distinguished by diligent execution and facility of touch. He died in 1533, aged thirty-nine years.

LEYDEN, JOHN, M.D., was born on the 8th of September, 1775, at Denholm, a village on the banks of the Teviot, in the parish of Cavers and county of Roxburgh. His parents, who were engaged in farming, gave him as good an education as their means allowed. After making great progress in his studies he was sent to Edinburgh in 1790, with the view of studying for the church. He was highly distinguished at college by his diligence and attainments, and made considerable progress in the Hebrew and Arabic languages. In 1798 he was ordained as a minister in the Presbyterian church; but he never obtained any popularity as a preacher; and finding that he was not likely to succeed in this profession, he applied himself to the study of medicine, and was appointed in 1802 as assistant-surgeon in the East India Company's service.

In 1803 he arrived at Madras, and immediately directed his attention to the study of the Eastern languages. In addition to the Sanskrit, Arabic, Persian, and Hindustani languages, he made himself master of many of the languages spoken in the Deccan, and obtained an extensive knowledge of the Malay and other kindred tongues. During his residence in India he was promoted from the office of surgeon to the professorship of Hindustani in Fort William college; and shortly afterwards to the office of judge of the Twenty-four Pargunnahs of Calcutta. In 1809 he was appointed one of the commissioners of the Court of Requests in Calcutta; and in the following year to the still more profitable situation of assay-master at the Calcutta Mint. He accompanied Lord Minto in the expedition against Java in 1811, and died in that island on the 28th of August, in the thirty-sixth year of his age.

Leyden did not publish much upon the Eastern languages, but what he has written bears evidence to the extent of his knowledge. His treatise 'On the Languages and Literature of the Indo-Chinese Nations,' published in the tenth volume of the 'Asiatic Researches,' contains an investigation of the origin and descent of the various tribes that inhabit the Malay peninsula and islands, and a comparison of their languages and customs; and his observations 'On the Rosheniah Sect,' published in the eleventh volume of the 'Asiatic Researches,' gives an account of an heretical sect among the Afghans, which appears to have arisen shortly before the accession of Akbar. His translation of the 'Malay Annals' was published after his death, by his friend Sir Stamford Raffles; and his MSS. contained many valuable treatises on the Eastern languages, translations from Sanskrit, Arabic, and Persian works, and several grammars of different languages, particularly one of the Malay and another of the Prakrit.

Leyden was an ardent admirer of poetry, and published many poems at various times, which were collected and published after his death by the Rev. James Morton, under the title of 'Poetical Remains of the late Dr. John Leyden,' Lond., 1819. He also contributed several pieces to Scott's 'Minstrelsy of the Scottish Border;' and edited the 'Complaint of Scotland,' an antient political tract in the Scottish language, as well as 'Scottish Descriptive Poems.' He was the author of 'A Historical and Philosophical Sketch of the Discoveries and Settlements of the Europeans in Northern and Western Africa, at the close of the eighteenth century:' of which an enlarged edition was published by Mr. H. Murray in 1818.

(Morton's *Memoirs of Dr. Leyden's Life*, prefixed to the 'Poetical Remains of the late Dr. J. Leyden.')

LEYT. [PHILIPPINE ISLANDS.]

LEYTON. [ESSEX.]

L'HASSA. [TIBET.]

L'HO'PITAL. [HÔPITAL.]

LI'ALIS, Mr. Gray's name for a genus of reptiles nearly related to *Bipes*. [BIPES, vol. iv., p. 417.]

LIAMONE. [CORSICA.]

LIAS, in geology, the name of a series of argillaceous and calcareous strata, forming the basis of the oolitic system. [GEOLOGY.] The term was originally applied, in the south of England, to the calcareous beds which are at the bottom of the thick argillaceous deposits, now ranked in the 'lias formation.' The lime burnt from the lias of Aberthaw, Bath, and Barrow-on-Soar, has the valuable property of setting in water. (Smeaton, in his *Account of the Eddystone Lighthouse*.)

LIBA'NIUS, a celebrated teacher of rhetoric, was born at Antioch in Syria, A.D. 314, of an ancient and noble family. After pursuing his studies with great diligence in his native city, he repaired to Athens, where he remained four years. He taught the arts of rhetoric and declamation at Athens, Constantinople, and Nicomedia, in succession, but being obliged to leave these places in consequence of the opposition of rival teachers who envied his superior talents, he returned in 354 to Antioch, where he chiefly resided during the remainder of his life. He was considered the most eminent rhetorician of his age; his school was frequented by numerous pupils, and he numbered among his disciples John Chrysostom and Theodore of Mopsuestia. The emperor Julian was a great admirer of his works; he imitated his style in his own writings, and after his accession to the empire formed an intimate friend-

ship with the rhetorician, and bestowed upon him the dignity of quæstor. It is related by Eunapius (*De Vit. Philosop. et Soph.*, p. 135) that one of the emperors (probably Theodosius the Great) gave him the honorary rank of præfect of the prætorium, but that it was declined by Libanius as a less illustrious title than that of Sophist. Libanius was alive in the year 390; since he mentions in a letter to Priscus (*Ep.* 866) that he was then seventy-six years of age.

Libanius was a pagan, and many of his works are written in defence of the heathen religion: yet this did not prevent his being on good terms with St. Basil. [BASIL.] There is a curious speech of his still extant addressed to the emperor Theodosius respecting the heathen temples, which has been translated into English by Dr. Lardner, in the eighth volume of his 'Credibility of the Gospel History.'

Most of the writings of Libanius have come down to us; they are chiefly declamations on the leading events of Greek history, and are characterized by Gibbon as 'the vain and idle compositions of an orator who cultivated the science of words; the productions of a recluse student, whose mind, regardless of his contemporaries, was incessantly fixed on the Trojan war and the Athenian commonwealth.' His oratorical works and moral treatises were published by Morel, 2 vols. fol., Par., 1606-27. The best edition of his declamations is by Reiske, 4 vols. 8vo., Leip., 1791. The letters of Libanius, which amount to more than 1600, were published by Wolf, fol., Amst., 1738.

LI'BANUS. [SYRIA.]

LIBATION, an essential part of sacrifice among the Greeks and Romans. It consisted in the offering up of any liquid to the gods, usually of wine, water, or milk. Libations were also made at funerals. (Pitisci *Lexicon Antiq. Roman.*, tom. ii., pp. 74, 75; Gyrald., *Syntag. Deorum*, l. xvii.)

LIBAU. [COURLAND.]

LIBEL is a malicious defamation, expressed either in writing, or by signs, pictures, &c., tending either to blacken the memory of one who is dead, or the reputation of one who is alive, and thereby exposing him to public hatred, contempt, or ridicule. (Hawk. *P. C.*)

This species of defamation is usually termed *written scandal*, and from the considerations that the offence is committed upon greater deliberation than the mere utterance of words, which are frequently employed hastily and without thought, and that the effect of a writing continues longer and is propagated farther and wider than verbal defamation, it is generally treated as a more serious mode of defamation than slander. [DEFAMATION; SLANDER.]

Whatever written words tend to render a man ridiculous or to lower him in the estimation of the world, amount to a libel; although the very same expressions, if spoken, would not have been slander or defamation in the legal sense of those words. [SLANDER.] To complete the offence, publication is necessary, that is, the communication of the libel to some person, either the person himself who is libelled or any other. The mere writing of defamatory matter without publication is not an offence punishable by law; but if a libel in a man's handwriting is found, the proof is thrown upon him to show that he did not also publish it.

There are two modes in which libellers may be punished, by indictment and by action.

The former mode is for the public offence, for every libel has a tendency to a breach of the peace by provoking the person libelled; the latter, by civil action on the case, to recover damages by the party for the injury caused to him by the libel.

On the criminal prosecution it is wholly immaterial whether the libel be true or false, inasmuch as it equally tends to a breach of the peace, and the provocation, not the falsehood, is the thing to be punished; and therefore the defendant on an indictment for publishing a libel is not allowed to allege the truth of it by way of justification. But in a civil action the libel must appear to be false as well as scandalous, for the defendant may justify the truth of the facts, and show that the plaintiff has received no injury at all.

But although the truth of a libel is no justification in a criminal prosecution, yet it is so far considered an extenuation of the offence, that the Court of King's Bench will not grant a criminal information unless the prosecutor by affidavit distinctly and clearly denies the truth of the matters imputed to him, except in those cases where the prosecutor resides abroad, or where the imputations are so general and indefinite that they cannot be expressly contradicted, or where the libel is a charge against the prosecutor for language held by him in parliament. And it has been said that a grand jury should be governed by the like rule in finding an indictment for the offence.

A fair report of judicial proceedings does not amount to a libel, but a publication of ex-parte proceedings before a magistrate may be punished as such.

A petition, containing scandalous matter, presented to parliament or to a committee of either house, and legal proceedings of any kind, however scandalous the words used may be, do not amount to a libel. But if the petition were delivered to any one not being a member of parliament, or the legal proceeding were commenced in a court not having jurisdiction of the cause, they would not be privileged. Confidential communication reasonably called for by the occasion, as charges made by a master in giving the character of his servant to a party inquiring after it, or a warning by a person to another with whom he is connected in business as to the credit or character of a third party about to deal with him, are considered as privileged communications, and are not deemed to be libels unless malice be proved, or the circumstances be such that malice may be inferred by the jury.

After some controversy, it is now settled that the jury, in a criminal prosecution for libel, must find not only the fact of publishing, but whether the matter in question be a libel or not (32 Geo. III., c. 60); but in a civil action the question whether the publication is or is not a libel is decided by the judge or court.

The punishment in a criminal prosecution may be fine and imprisonment; and upon a second conviction for publishing a blasphemous and seditious libel, the court may sentence the offender to banishment for any term it may think fit. (1 Geo. IV., c. 8.)

The law of libel has been frequently complained of, and with some appearance of reason, particularly that part of it which prevents the defendant from giving evidence of the truth of the libel in justification when subjected to a criminal prosecution. This is not the place for a discussion of the many reasons which have been adduced against the rule. Almost the only reason, if reason it can be called, which has been alleged in its favour is the one already alluded to, that the libel, whether true or false, equally tends to a breach of the peace; or, as it has been somewhat whimsically said, the being true makes the libel more likely to produce a breach of the peace. Lord Mansfield indeed from the bench has said, 'the greater the truth, the greater the libel.' Much discussion has taken place upon this subject, but it seems questionable whether any improvement will be speedily obtained.

The printer of a libel is liable to prosecution as well as the writer, and so is the person who sells it, even though ignorant of its contents.

It does not seem to be generally known, that by the 28th section of the 38 Geo. III., c. 78, a bill of discovery may be supported against the editor of a newspaper or other person concerned in the publication or interested in the property thereof, to compel a disclosure of the name of the author of the libel, or of the name of any person connected with the publication against whom the party libelled may think proper to bring an action; and such a bill might also be maintained against any person suspected of being the author, which would compel him to discover on oath whether he did or did not write the libel in question.

(Bl. *Com.*; Starkie and Holt *On Libel*; Selw., *N. P.*; Bac. *Abr.*, tit. 'Libel.')

LI'BER, the inner bark of a plant, is a layer consisting of woody tissue, cellular substance, and vessels of the latex, forming a compact zone immediately applied to the wood. The woody tissue of which it is composed quickly becomes thick-sided, by the addition of internal ligneous strata, the consequence of which is, that such tissue in this part is more tough than elsewhere. Hence it is usually from the liber that are extracted the fibres employed in making cordage or linen-thread: this at least is its source in hemp, flax, the lime-tree, the lace-bark, and the many other exogens which furnish thread; but in endogens, which have no liber, as the cocoa-nut, it is the ordinary woody bundles of the leaves, stem, and husks of the fruit from which the fibre used for ropes is procured. It is said that certain exogens,

such as Menispermaceæ, have no liber. (*Comptes Rendus*, v. 393.) In many plants a new layer of liber is formed annually, contemporaneously with a new layer of wood, but this is by no means universal; on the contrary, the oak and the elm increase their liber slowly and irregularly.

It is asserted that the liber serves for the downward channel of the sap, just as the alburnum does for its upward course; but this, like many other assertions in vegetable physiology, requires confirmation. There is no doubt that fluids descend through the bark of trees and rise through their wood; but whether the former takes place exclusively through the liber, and if so, whether through the woody-tissue, the laticiferous vessels, or the cellular substance, is not proved. It may be doubted whether the whole of the mesophlœum, or inner cortical layer, does not assist in this function.

LIBER REGIS, another term for the *Valor Ecclesiasticus* of the 26th Henry VIII.; the book containing an account of the valuation of the whole ecclesiastical property of England and Wales, in the state in which it stood on the eve of the Reformation. By an act of the 23rd of Henry VIII., the payment of annates, meaning the first-fruits of bishoprics and archbishoprics, with all sums paid for palls, bulls, and the like, at the consecration of every new prelate, were restrained. This was followed by an act in the 26th Henry VIII., for the payment not only of 'first-fruits of all dignities, benefices, and promotions spiritual,' but also of an 'annual pension of the tenth part of all the possessions of the church, spiritual and temporal, to the king and his heirs,' as supreme heads of the church of England. The Valor Ecclesiasticus is the return which the commissioners under this act made into the exchequer. This record, in full, except certain portions which have been lost, was published under the orders of the commissioners upon the records of the realm, in 6 volumes folio, London, 1810-1834. An abridgement of it is preserved in the Office of First-Fruits, entitled 'Liber Valorum,' and was the foundation of the 'Liber Regis, vel Thesaurus Rerum Ecclesiasticarum,' by John Bacon, Esq., receiver of the first-fruits, with an appendix, &c., 4to., Lond., 1786. This latter work also contains an account of such benefices as have been since discharged from any payment to the above revenues, on account of the smallness of their income. Queen Anne, as an act of royal bounty to the church, in the second year of her reign, gave up first fruits and tenths as a source of revenue; not back to the hands which had to render them; but to trustees who were empowered to administer them for the benefit of the poorer clergy. This gift of the queen was confirmed by act of parliament, 2 and 3 Anne ch. ii.

LIBE'RIUS was elected to succeed Julius I. in the see of Rome, A.D. 353. The Semi-Arians countenanced by the Emperor Constantius had then the ascendant, and both the council of Arles, A.D. 353, and that of Milan, 353, condemned Athanasius, bishop of Alexandria. As Liberius, together with some other Western bishops, refused to subscribe to this condemnation, he was arrested, by order of the emperor, and taken to Milan, where he had a conference with Constantius. The questions and answers in this conference are still extant in Constant's 'Epistolæ Romanorum Pontificum.' The conference terminated in a sentence from the emperor deposing Liberius from his office, and banishing him to Berœa in Macedonia. The emperor caused Felix, a deacon at Rome, to be consecrated bishop. A petition was presented to the emperor by the principal ladies of Rome in favour of Liberius, but it was not till 358 that Liberius was restored to his see, and not without having first approved in several letters of the deposition of Athanasius, and subscribed to the confession of faith drawn up by the court party at the council of Sirmium. The weakness of Liberius had a mischievous influence upon many of the Italian bishops, and the council of Rimini openly countenanced Arianism; but it is not true, as asserted by some, that Liberius subscribed the Rimini confession of faith. He ended his career in orthodoxy, and died in 366. He was succeeded by Damasus I. Liberius is said to have built the Basilica on the Esquiline Mount, which has been called Liberiana, from his name, and is now known by the name of Santa Maria Maggiore.

LIBERTI'NUS. In the Roman polity persons were divided, with respect to status or condition, into freemen (liberi) or slaves (servi). Freemen again were divided into persons who were born in a state of freedom (ingenui), and libertini, or those who had been manumitted. (Gaius i., 10, &c.; and compare Horace, *Serm.*, i. 6; v. 6, 21.) A manumitted slave was called 'libertus,' that is, 'liberatus,' 'freed,' with reference to the act of manumission, and to his master, who, by manumitting him, became his patron (patronus): he was called 'libertinus' with reference to the class to which, by the act of manumission, he belonged. It is sometimes said in modern works that the 'libertinus' was the son of the 'libertus;' and such, according to Suetonius, was the meaning of the term 'libertinus' in the time of the censor Appius Claudius, and for some time after (Claud., c. 24); but the meaning of the term 'libertinus' in aftertimes was what is here stated.

A manumitted slave might either become a full Roman citizen or a Latinus [LATINUM JUS], or he might obtain no higher privileges than the class called Dediticii. The grounds and conditions of this triple distinction are fully explained by Gaius (i., 12, &c.). The three modes of manumission, by any one of which the freedman might obtain the rights of a Roman citizen, were the 'vindicta,' 'census,' and 'testamentum.' The practice of manumitting slaves having become very common, and being productive of great inconvenience, various provisions in restriction of the power were imposed by the Lex Aelia Sentia, which passed in the time of Augustus. By this law, if a person manumitted a slave for the purpose of defrauding his creditors, or for the purpose of detracting from the rights of his patron, the manumission was void. By the Lex Furia (Fufia) Caninia, which was also passed in the time of Augustus, before the Lex Aelia Sentia, a man could only manumit by his testament a certain proportion of his slaves. This enactment, of wholesome tendency in a state where slavery exists, was repealed by Justinian's Legislation.

Though the sons of 'libertini' were ingenui, it appears from numerous passages of the Roman writers that they were not unfrequently exposed to the taunts and sneers of those who could boast a pure descent from free-born ancestors. Horace says of himself, 'Quem rodunt omnes libertino patre natum.' (*Serm.*, i., 6, 46.)

When we consider that Roman slaves were brought from all parts of the world and were often manumitted, not because of the goodness of their character, but from many and insufficient causes, in addition to mere whim and caprice, it may be presumed that, as a class, the 'libertini' had not much to recommend them.

It appears from the definition of Gentilis, as given or sanctioned by the Pontifex Scævola (Cic., *Topic.*, 6), that a 'libertinus' could have no Gens; but the doctrine of the Gentilitas (gentilicium jus), which was once of great importance as to the succession to the property of an intestate, had fallen into desuetude in the time of Gaius (iii., 17). Two inscriptions (Nos. 3024, 3029) in Orelli, probably of a late date, commemorate the fact of a freedman marrying his former mistress (patrona).

The relation between a freedman and his patronus is more properly discussed under the head of PATRONUS.

LIBERTUS. [LIBERTINUS.]

LIBERTY. The general nature of a liberty, as a portion of the royal prerogative in the hands of a subject, has been already shown under FRANCHISE. Liberties were at first chiefly granted to monastic and other religious establishments, in ease of the consciences of the royal grantors, or in testimony of their devotion to the church; and most of the antient franchises now in existence are derived from an ecclesiastical source. They were afterwards granted as means of strengthening municipal corporations.

Though all Liberties emanate from the royal prerogative, a distinction is usually made between such liberties as have been actually exercised by the crown before the grant to the subject, and such as (being merely latent in the crown) are said to be created de novo upon their being granted. The former, when by escheat, forfeiture, or otherwise, they come again to the crown, are extinguished by merging in the general prerogative, and cannot afterwards be regranted as existing franchises: the latter still have continuance for the benefit of the crown or of any subsequent grantee. To the former class belong such privileges as the right to have the goods of felons, &c., waifs, estrays, deodands, and wreck, arising within the lands of the grantee; to the latter, the return of writs, the right of holding fairs and markets and taking the tolls, the right of holding a hundred-court or a court-leet, the privileges of having a free-warren [WARREN] or a legal park [PARK], and the like;

nd in such cases the franchises, even whilst in the king's hands, are exempt from the jurisdiction of the ordinary officers of the crown, and are administered by bailiffs or other special officers, as when in the hands of a subject.

It is however only in a very wide and loose sense that franchises of the latter class can be said to be part of the royal prerogative of the crown, inasmuch as the prerogative is limited to the *creation* of such franchises, and they can never be enjoyed by the crown except as claiming them under a subject to whom they have been granted.

The fines paid to the crown for grants or confirmations of liberties are shown by Madox to have formed no inconsiderable part of the royal revenue. In his 'History of the Exchequer' he quotes the particulars of about 200 liberties, granted principally by King John. The following may serve as a specimen of the terms upon which the parties fined or made agreement with the crown. The men of Cornwall fine in 2000 marks and 200 marks for 20 palfreys estimated at 10 marks each, for a charter for disafforesting the county and choosing their own sheriffs. The men of Brough fine in 20 marks and 5 marks for a palfrey, for a market on Sunday, and a fair for two days. The men of Launceston fine in 5 marks for changing their market from Sunday to Thursday. Henry de la Pommeraie fines in 5 marks 'that the men of Lidford may not have a better liberty than the men of Exeter.' Alanus de Munbi fines in 100 marks and 3 good palfreys for a charter of exemption from suit at county courts and hundred-courts for his life. Thomas of York, son of Olivet, fines in one huntsman (unum fugatorem), that he may be alderman in the merchant's gild at York. Agnes, the widow of Walter Clifford, fines in one good palfrey to have her manor of Witham in Kent, and that the men of the said manor, being her men, be acquitted of shires, and hundreds, and suits to the county courts and aids of sheriffs and bailiffs, and for the king's letters-patent thereof. The burgesses of Shrewsbury fine in 20 marks and one palfrey that no one shall buy within the borough new skins or undressed cloth, unless he be *in lot* (in *lotto*), and assessed and taxed with the burgesses. [SCOT AND LOT.]

Many of these franchises having been found to interfere with the regular and speedy administration of justice, the extension of them by fresh grants was frequently the subject of very loud complaints on the part of the commons in parliament, who represented them as prejudicial to the crown, an impediment to justice, and a damage to the people. It appears by the Parliament Roll, that Edward I., towards the close of his reign (in 1306), declared that after the grant which he had made to the earl of Lincoln for his life, of the return of writs within two hundreds, he would not grant a similar franchise *as long as he lived* to any except his own children, and directed that the declaration should be written in the Chancery, the Gardrobe, and the Exchequer. And in 1347, Edward III., in answer to a strong remonstrance, promised that such grants should not in future be made without good advice.

The form in which the crown granted views of frankpledge [LEET] and other franchises may be seen in the charters granted by King Henry VI. to Eton College, and King's College, Cambridge. (5 *Rot. Parl.*, 51, 97.)

A person exercising a franchise to which he has not a legal title may be called upon to show cause by what authority he does so, by a writ of quo-warranto, or an information in the nature of a quo-warranto. [INFORMATION; QUO-WARRANTO.] And parties disturbed in the lawful exercise of a franchise may recover damages against the disturber in an action on the case.

LIBI'NIA, Dr. Leach's name for a genus of brachyurous crustaceans, placed by Mr. Bell under the family MAIIDÆ.

LIBOURNE, a town in France, capital of an arrondissement in the department of Gironde; situated on the north or right bank of the Dordogne, 346 miles from Paris by Orléans and Limoges, and 25 from Bordeaux. Libourne was built by Edward I. of England (at that time duke of Guienne), out of the ruins of an old Roman town or post, mentioned by Ausonius, called Condate Portus or Condate ad Portum: the name Condate, applied to seven different places in antient Gaul, is considered by M. de Valois to mean the confluence or junction of rivers, but by M. d'Anville, a tongue of land: whichever of these may be the meaning, the name is sufficiently applicable to Libourne. It is a tolerably well built town, surrounded by strong walls and pleasant promenades. The streets are wide and straight and there is a good place or open space. There are seven gates, four toward the rivers and three toward the land: there is a handsome bridge of nine arches over the Dordogne built of brick and stone; and a quay along the bank of that river, but vessels can lie also in the Isle. Vessels of 300 tons can come up with the tide, which rises 10 feet at ordinary times, and 15 feet at the equinoxes. There were several churches and religious houses before the Revolution. The population in 1831 was 8046 for the town, or 9838 for the whole commune: in 1836 it was reduced to 9714 for the whole commune. Some woollen stuffs, military accoutrements, leather and cordage are manufactured. The principal trade is in wine, brandy, and salt, which last is sent up the Dordogne for the supply of the departments of Dordogne and Lot. A considerable quantity of corn and timber is shipped here for Bordeaux. There are several yearly fairs. The town has an agricultural society, an 'Athenæum,' a public library of 3000 volumes, a free school for navigation and drawing, a museum of natural history, and a botanic garden. There are an exchange, and several government offices for fiscal or judicial purposes; also a range of barracks, and a theatre. The environs of the town are fertile in corn and wine.

The arrondissement is subdivided into nine cantons, and 133 communes; it comprehends an area of 497 square miles, and had in 1831 a population of 107,514, and in 1836 of 107,464.

LIBRA (the Balance). In the older Greek writers the Scorpion occupies two constellations of the ZODIAC, or rather the body of the animal occupies one, and the claws, *chelæ* (χηλαί), another. We say this, because though the chelæ were certainly a part of the Scorpion, yet they are often mentioned (as by Aratus, for instance) by themselves, as if they formed a distinct constellation. The word *chela* had several significations; so that it may have been by simple mistranslation that the Romans (according to Hyginus, Virgil, &c.) gave the name of Libra to the part of the heavens in question, and drew back the claws of the Scorpion to make room for the scales.

Libra is surrounded by Scorpius, Ophiuchus, Virgo, Cen

Character. (Not in Bayer.)	No. in Catalogue of: Flamsteed. (Piazzi) [Bradley.] Zach (Z).	No. in Catalogue of: Astron. Society.	Magnitude.	Character. (Not in Bayer.)	No. in Catalogue of: Flamsteed. (Piazzi) [Bradley.] Zach (Z).	No. in Catalogue of: Astron. Society.	Magnitude.
	2	1631	7	ζ^4	35	1759	6
	3	1656	6		36	1762	6
	4	1663	6	(*f*)	37	1763	5½
(ρ)	5	1669	6	γ	38	1761	3½
	6	1678	5		39	1768	4
μ	7	1677	5		40	1774	4
	8	1680	6	(φ)	41	1778	6
α	9	1681	2	(χ)	42	1780	6
(σ)	10	1684	6	κ	43	1781	4
(*d*)	11	1683	6	η	44	1787	4
	12	1687	6	λ	45	1807	4
ξ^1	13	1688	6	θ	46	1811	4
	14	1692	6		47	1814	6
ξ^2	15	1691	6	(ψ)	48	1820	4
(*c*)	16	1694	5½		49	1826	6
	17	1697	7		50	1827	6½
	18	1699	6	ξ*	51	1833	4
δ	19	1701	4		(54)	1746	6
γ*	20	1705	3		(96)	1758	6½
ν^1	21	1711	5		(120)	1773	7
ν^2	22	1712	6		(127)	1651	6½
ι^1	24	1721	5		(166)	1668	7
ι^2	25	1723	6		(171)	1673	7
(τ)	26	1725	6		(188)	1682	6
β	27	1732	2		(212)	1690	6
(υ)	28	1740	6		(241)	1702	7
o^1	29	1741	6		(245)	1703	7
o^2	30	1744	6		(262)	1709	7
ε	31	1747	4		[1987]	1788	7
ζ^1	32	1750	6		1060 Z	1752	7
ζ^3	34	1755	6				

* Flamsteed used these letters (Baily's *Flamsteed*), thinking he thereby followed Bayer; whereas in fact these stars are in Bayer γ and ξ Scorpii, not and ξ Libræ.

taurus, and Lupus. Its star β is the vertex of an isosceles triangle, of which Arcturus and Spica (α Virginis) are at the extremities of the base. Its principal stars are given in the preceding page.

LIBRARY. The practice of forming collections of books would naturally commence as soon as books began to be multiplied. All the countries of the antient world in which learning had established herself possessed libraries, which are as indispensable for the sustenance of learning as food is for the sustenance of the body. The high price of books while all books were manuscripts only made it the more necessary that public libraries should be provided for the purposes of study, seeing that the purchase of books was in most cases beyond the reach of private students. Yet we read of many collections of books made by wealthy private individuals for their own use, both among the Greeks and Romans. Among the most extensive and famous of the public libraries of antiquity were the library of the Ptolemies at Alexandria, the library of the kings of Pergamus, and that founded at Rome by the emperor Trajan, which he called, after his own name (Ulpius), the Ulpian Library. The greatest libraries of the middle ages were those of the Arabs, established in their various dominions in Asia, in Africa, and in Spain, and the imperial library at Constantinople. Of all these renowned collections a few stray volumes only have come down to our times. The most extensive existing libraries in the several countries of modern Europe are: in Italy, the Vatican Library at Rome, the Maglabecchian Library at Florence, the Ambrosian at Milan, the library of Bologna, the University Library at Genoa, and that of St. Mark at Venice; in Spain, that of the Escurial; in France, the Royal Library at Paris, the Mazarin Library, and those of the Arsenal, of St. Geneviève, and of the Institute, in the same city, and the public libraries of Lyon and Bordeaux; in Germany, the Imperial Library at Vienna, the royal libraries of Berlin, Dresden, and Stuttgard, and the University Library of Göttingen; in Holland, the public library of Amsterdam, and the University Library at Leyden; in Russia, the Imperial Library at St. Petersburg; in Denmark, the Royal Library at Copenhagen; in the United Kingdom, the Bodleian Library at Oxford, the University Library of Cambridge, that of the British Museum in London, the Advocates' Library in Edinburgh, and that of Trinity College in Dublin. Most or all of these collections will be found noticed under the names of the places where they exist. In the United States of America, according to the 'Encyclopædia Americana,' the principal libraries are, or were in 1831, that of Harvard College, containing 36,000 volumes; the Philadelphia Library, containing 27,000; that of the Boston Athenæum, containing 26,000; that of Congress, containing 16,000; and that of Charleston, containing 13,000.

LIBRATION, a balancing motion, in which there is a position on one side and the other of which a body vibrates, being in fact the same in meaning as oscillation. This term is however particularly applied to a small irregularity, compounded of the moon's rotation round her axis and her orbital motion, by means of which her visible hemisphere is not always quite the same.

The mean revolution of the moon round her axis is the same period of time as her mean revolution in her orbit. If both motions were equable the moon would always present the same face to a spectator placed at the centre of the earth, on condition that the plane of her equator passed through the centre of the earth. None of these conditions being exactly fulfilled, and the variations being small and periodic, the consequence is that a small portion of the moon's surface in the eastern and western edges, and also in the northern and southern, is alternately visible and invisible. There is perhaps no subject in astronomy so difficult to explain to a reader who is not familiar with solid geometry; and the subject is not of sufficient importance to deserve any detail of illustration.

LI'BYA. [AFRICA.]

LICENTIATE IN MEDICINE is a physician who has a licence to practise granted by the College of Physicians. There are two classes: licentiates, who are authorized to practise in London and within seven miles thereof; and extra-licentiates, who are only privileged to practise in the country at a greater distance from the metropolis. The former class are authorized exclusively by the College of Physicians, but medical graduates of Cambridge or Oxford may practise in the provinces independently of the college licence.

LICHANO'TUS, Illiger's name for a genus of Cheiropeds or Quadrumanes (*Indris* of Lacépède, Geoffroy, and others) belonging to the family *Lemuridæ.*

The Indris are inhabitants of Madagascar, and two species only seem generally recognised, namely, *Indri brevicaudatus* of Geoffroy, *Lemur Indri* of Gmelin; and *Indri longicaudatus* of Geoffroy, *Lemur laniger* of Gmelin, *Indri laniger* of Fischer. Cuvier indeed recognises but one species, namely, that first above named, and says in a note that the other requires consideration ('a besoin d'être revu').

Dr. Fischer adopts both under the names of *Indri brevicaudatus*, Geoff., and *Indri laniger*, marking however the latter as doubtful.

M. Lesson, in his 'Manuel,' also gives both species under the generic name of *Indris*, Lacépède, and the specific names of *Indris brevicaudatus*, Geoff., *L'Indri*, Sonnerat; and *Indris longicaudatus*, Geoff., *Le Maki fauve*, Buffon, *Le Maki à bourre*, Sonnerat; with the following dental formula: — Incisors $\frac{4}{4}$; canines $\frac{1-1}{1-1}$; molars $\frac{5-5}{5-5}$ = 32; the same number recorded for both species by Fischer. M. Temminck (*Mammalogie*) notices only one species.

Mr. Gray places *Lichanotus* and *Indris* in his subfamily *Lichanotina*, between *Lemurina* and *Loridina*, in his third family *Lemuridæ*, which is the first in his second or Quadrupedoid section of his order *Primates.* (*Annals of Philosophy*, 1825.)

Mr. Swainson confines the generic term *Indris*, Lacép., to the *Lemur laniger* of Gmelin, and that of *Lichanotus* to the *Lemur Indri*, Gm. To both Mr. Swainson assigns the same number of incisors and grinders as that above stated; but he gives canine teeth $\frac{1-1}{1-1}$ to *Lichanotus* only. He places these two genera between *Lemur*, Linn., and *Scartes*, Sw., in the family *Lemuridæ.* (*Classification of Quadrupeds*, 1835.)

M. Geoffroy (*Magaz. Encyclopédique*) observes that there are four cutting teeth in the upper jaw, not two, as mentioned by Sonnerat.

M. F. Cuvier states that the dental system of the *Indri* is only known to him from the extremity of the jaws, which offers in the *upper jaw* incisors like those of the *Red Lemur*, a canine tooth very much curved and entirely like two false molars which are found immediately next to it, and which have only a single point; in the *lower jaw* two incisors only, the first very narrow, and the second wider, but both couched forwards ('couchées en avant'), like those of the Makis or true Lemurs, the canine small, and resembling a false molar which follows it, which has only a single point, and which is much wider before than behind, thickening from the external to the internal edge.

The figures and descriptions of these two species are given by Sonnerat in his 'Second Voyage,' and seem to be



Black or Tailless Indri.

the source whence the subsequent accounts have been principally taken.

The first, noticed by Pennant as the Indri (under the title *Maucauco*), is described as a large animal three feet and a half high, entirely black, except on the face, which is greyish, on the lower part of the abdomen, where a greyish cast prevails, and on the rump, which is white. The face is stated to be of a lengthened dog-like form, the ears rather short but much tufted, the hair or fur silky and thick, curly in some parts. The nails are said to be flat but pointed, and there is no appearance of a tail.

Locality, Madagascar.

Habits.—The animal is described as gentle and docile, and as being trained when young for the chase, as dogs are. Its note is stated to resemble a child's crying, whence not improbably its Madagascar name *Indri*, which is said to signify *Man of the Wood*.

The other species, *Flocky Lemur* of Shaw, is stated to be a foot and nine inches from nose to end of tail, the tail being nine inches. The colour pale yellowish ferruginous above, and white beneath; the tail bright ferruginous. The fur extremely soft, and curled deepest about the loins Face black; eyes large and greenish-grey. The animal is described as having two fore-teeth in the upper jaw, and four in the lower (Quære tamen), and pentadactyle feet, with long claws, except the thumbs, which are furnished with rounded nails.

Dr. Shaw observes that Pennant, in the last edition of his 'History of Quadrupeds,' seems to think this animal no other than the *Lemur Mongooz*, or Woolly Macauco; but the Dr. adds, that if Sonnerat's description be just, the species must certainly be a different one from *L. Mongooz*.



Flocky Indri.

Dr. Shaw is of opinion that *Le Petit Makis Gris* (Buffon, *Supp.*, tom. vii., p. 121, pl. 34) and the *Autre Espèce de Maki* (Buff., *Supp.*, tom. vii., p. 123, t 35) are smaller varieties of the Flocky Lemur; but this view does not seem to be adopted by the more modern zoologists. Skeletons and skins of the Indris would be an acquisition to our museums, and would clear up doubtful points.

LICHAS, Dalman's name for a group of Trilobites forming a division of the great genus Asaphus of Brongniart.

LICHENIC ACID. [MALIC ACID.]

LICHENIN, a peculiar vegetable product, sometimes called *lichen starch*. It is obtained from the *Cetraria islandica*, or liverwort, which is to be cut small and infused in eighteen times its quantity of cold water, in which about a quarter of an ounce of carbonate of potash is dissolved for every pound of the liverwort employed. After remaining twenty-four hours, the infusion is drained from the liverwort without pressure: it is then to be repeatedly washed with cold water, and afterwards boiled in nine times its weight of water down to six; the decoction is strained and the liverwort squeezed while hot; a gelatinous white substance is soon formed, which, after being dried gently on cloth, becomes of a dark colour and hard. Being re-dissolved in boiling water and again strained, it gelatinizes.

When pure it is white, and it retains water; but on drying it becomes yellowish. In thin plates it is transparent. It is tough, tasteless, nearly inodorous, swells up when put into cold water, but dissolves sparingly in it. With hot water a gelatinous solution is obtained, which is decomposed, and yields a precipitate with di-acetate of lead, and with solution of iodine gives either a dingy green colour, or, as is stated by some authors, a blue one, as starch does. It is said to be poisonous.

Lichenin is stated to possess the alkaline property of combining with acids; but it does not form crystallizable salts with them. It is composed of about

Hydrogen	. 7·24,	or nearly 10 equivs.	=	10 =	6·66
Carbon	. 39·33,	„ 10 „	=	60 =	40 00
Oxygen	. 53·43,	„ 10 „	=	80 =	53·34
	100·			150	100·

LICHENO'PORA. The fossils ranked under this title by Defrance are thought by Blainville to be young Retepora ('Actinologie,' p. 407.)

LI'CHENS, a large and important natural order of imperfectly organized plants, containing numerous species employed in the arts as pigments, and as articles of food. It is principally in the former respect that they are of economical interest, in consequence of the great consumption of orchall, or archil [ARCHIL], Cudbear (Lecidea tartarea), and others by the dyer; the estimated value of the annual imports of these plants being from 60,000*l.* to 80,000*l.*

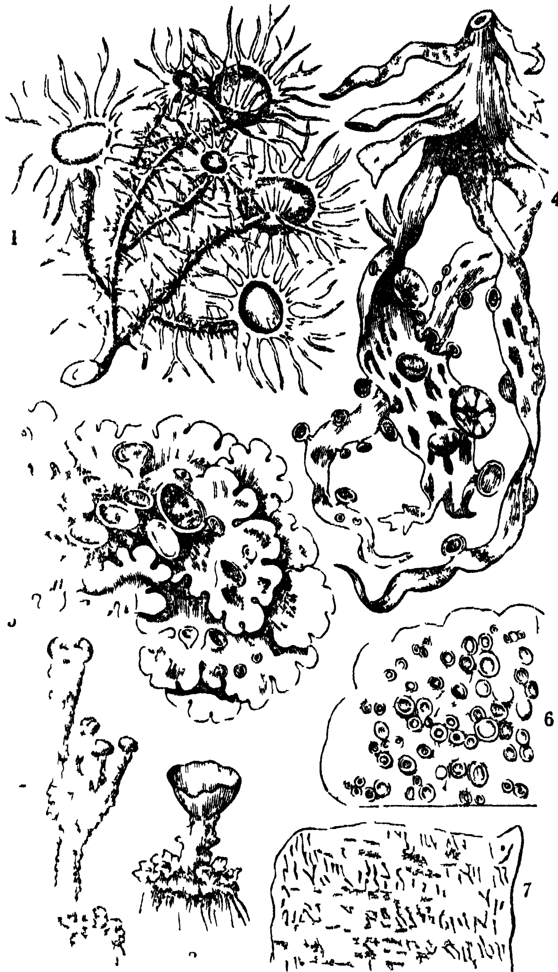
Lichens are perennial plants, requiring free access to light and air, of the most simple organization, forming irregular patches upon the surface of stones, trees, the earth, and other bodies. Their structure is imperfectly cellular, without any trace of vascularity. The cells of which they consist are spheroidal or cylindrical, tubular or fibrous, empty or filled with a grumous matter, in a loose and indefinite state of aggregation, but generally consolidated into two strata, the one external or cortical, the other internal or medullary. The membranous or other expansion, which in these plants consists of a combination of stem and leaf, is of the most unequal and uncertain degree of development, in some species appearing like misshapen leaves spreading over the surface on which it grows, in other cases rising up as a stem of various figures, but always more or less unsymmetrical, and in many instances constituting little more than a stain upon the face of a tree or rock, this body is a frond, or, as it is technically called, a thallus The fructification of lichens consists of a round or linear, convex or concave, cup, called apothecium, or shield, at first closed, but afterwards expanding and producing a nucleus (stratum proligerum) in which are embodied the spores The shield is surrounded by a border (excipulus) which originates either from the substance of the thallus (thallodes) or from the base of the shield itself (proprius), or from both (thallodes and proprius).

Lichens are distributed over all parts of the world, forming in the polar and similar regions a food for animals and man. Cladonia rangiferina supports the rein-deer, Cetraria islandica furnishes the nutritious Iceland moss of the druggists' shops; and various species of Gyrophora, under the name of Tripe de Roche, form a part of the supply of food scantily furnished by nature for the Canadian hunter. In warmer countries they acquire a firmer consistence and appear to form secretions of a peculiar kind in much greater abundance than in the northern parts of the world Orchall, for example, grows in Great Britain and the Canaries, and botanists can detect no external differences between the plants of these two countries; yet in the former its dyeing matter is secreted so abundantly that Canary samples fetch from 250*l.* to 350*l.* a ton in the market, while the English are unsaleable.

The prevalent principles found in lichens are a peculiar kind of gluten-resembling starch, a bitter secretion, and a resin combined with an unctuous colouring matter yielding purple, yellow, and brown dyes. In consequence of their bitterness some have been employed as febrifuges, as Variolaria faginea, Parmelia parietina, and several others.

There are between 50 and 60 genera, arranged in three suborders. (Fries, *Lichenographia Europæa*: Fée, *Méthode Lichenographique*; Wallroth, *Naturgeschichte der Flechten*; Eschweiler, *Systema Lichenum*.)

The following cut shows the various stages of development in the lichens of this country.



[illegible] stages of development [illegible]

[illegible]

LICHFIELD is a city and county of itself although locally situated within the county of Stafford in 52° 54′ N lat. and 1° 1[illegible]′ W long., and 118 miles north-west by north from London. The limits of the parliamentary borough comprehend the whole of the town together with the surrounding country to the distance of rather more than a mile; but within this boundary, and a little to the north-west of the city, there is a small space called the close, which possesses a separate jurisdiction distinct not merely from that of Lichfield, but also from that of Staffordshire. The corporation had its origin in the year 1387, when Richard II granted to the guild a licence to purchase lands to the amount of 10*l.* a year. This guild was dissolved by Edward VI, who granted a charter of incorporation to the city; and Queen Mary, in the first year of her reign, erected the city and suburbs into a distinct county independent of the county of Stafford. The next charter was that of 20 James I, which authorizes the establishment of two weekly markets, and empowers the bailiffs to receive the tolls and customs thereof. To this succeeded the charter of 16 Charles II. In 1686 James II obliged the corporation to surrender their charters, which however were restored to them the following year, when all their former privileges and immunities were acknowledged and confirmed.

By the Municipal Corporation Act Lichfield is divided into two wards, with six aldermen and eighteen councillors. Neither the property nor the expenditure of the corporation is known, in consequence of the municipal authorities refusing to communicate with the parliamentary commissioners appointed in the year 1835; but the revenue is supposed not to exceed 300*l.* per annum, and arises chiefly from landed property. The tolls of the markets were compounded for in 1741 by Sir Lister Holt, one of the members for the city, who paid the corporation 400*l.*, in consideration of which it was agreed that the city should thenceforward be 'discharged from all tolls whatever upon a market-day except picking.' The fairs are held January 10, Shrove Tuesday, Ash Wednesday, and the first Tuesday in November. The market days are Tuesday and Friday. The borough has returned two members to parliament continuously from the reign of Edward I. The incorporated companies are seven in number, namely, the tailors, bakers, sadlers, butchers, smiths, cordwainers, and weavers, in each of which are included several subordinate trades.

The name 'Lichfield' is of Saxon etymology, and, according to Dr. Harwood, refers to the marshy nature of the surrounding country. The houses in the principal streets are handsome and well built, and the whole city is supplied with excellent water, and paved and lighted. The gaol and house of correction are well constructed, and admit of classification of the prisoners.

Lichfield, in union with Coventry, is an episcopal see. The cathedral sustained considerable injury during the civil wars, but was restored by Dr. Hacket in 1661, and more recently very extensive repairs and alterations have been effected under the superintendence of Mr. Wyatt. Its total length from east to west is 410 feet, and the width along the transepts measures 1[illegible]3 feet. There are three spires, of which the central rises to the height of 280 feet, the whole being ornamented with a profusion of very elaborate workmanship. In the interior are numerous monuments, and among them is one of Dr. Samuel Johnson, who was born in this city, and to whose memory a statue has been recently erected. (See Harwood's *History and Antiquities of the Church and City of Lichfield*, 4to, 1806, and also Dugdale's *Monasticon Anglicanum*.) The other churches are respectively dedicated to St. Chad, St. Michael, and St. Mary. The livings attached to the first two are paid curacies valued at 90*l.* and 137*l.* per annum, the last is a vicarage in the patronage of the dean and chapter of Lichfield, and possesses an average net income of 458*l.* The population of the borough in 1831 was 6252, which includes the population of the 'close.'

The free school of Lichfield is stated, but upon very doubtful authority, to have been founded by Edward VI. As early as the reign of Henry III the bishops of the diocese founded a religious establishment which subsequently went under the appellation of the 'Hospital School;' but near the close of the seventeenth century, in consequence of previous mismanagement, the affairs of this institution became subject to the superintendence of the master of the free grammar school, and in 1740 the chief part of its funds were transferred to the last-mentioned establishment, since which time the two foundations are considered to have merged into one.

In 1835 there were 21 scholars upon the foundation, besides boarders, and at that time the school was described as being in a flourishing condition. For particular information relative to the management and state of the funds of this school and the other benevolent foundations of Lichfield the reader is referred to the Seventh Report of the Parliamentary Commissioners on Charities. (*Boundary Reports*, &c., and the several authorities mentioned above.)

LICHTENBERG, a principality situated between the Bavarian circle of the Rhine, the Prussian province of the Lower Rhine, Oldenburg, and Hesse Homburg, has an area of 236 square miles, with 31,000 inhabitants. It was formerly called the lordship of Baumholder, and according to the decision of the congress of Vienna was ceded in 1816 by Prussia to the duke of Saxe Coburg, who gave it the rank of a principality, calling it Lichtenberg, after an ancient castle, with a representative council of seven members, chosen by fifty electors. But the French Revolution in July, 1830, and the troubles in Rhenish Bavaria, excited some disturbances in the principality, particularly in St. Wendel, the chief town, to suppress which it was necessary to call in Prussian troops. This induced the duke to cede the principality, with all the rights of sovereignty, to Prussia in 1834. Prussia in return pays the duke an annual sum of 80,000 dollars, till Coburg shall be able to purchase an equivalent in landed estates which shall in every respect supply the place of Lichtenberg. Prussia unites the contingent of 250 men to the army of the Confederation with its own.

LICHTENBERG, GEORGE CHRISTOPHER, deserves a place in every English biographical work, if only on account of his admirable 'Erklärung der Hogarthischen Kupferstiche,' wherein he has entered far more completely into the spirit of our great artist's works, than any of his English illustrators and commentators, scarcely excepting Charles Lamb, whose 'Essay on Hogarth' is besides a mere sketch in comparison with the extensive canvas filled up by the German. Had he written nothing else of a humourous nature, this production would have established Lichtenberg's reputation for searching keenness of wit, comic power, and for both playful and severe satire. Hardly is this praise any exaggeration, since, independently of its literary merit as an original work, it displays an intimate acquaintance with the subject, which in a foreigner is little short of wonderful—equally wonderful is it perhaps, that scarcely one of Hogarth's later biographers or editors should have been aware of its existence, otherwise they would undoubtedly have made mention of it, if they did no more. Unfortunately however he did not live to complete his work.

Lichtenberg was born at Ober-Ramstadt, near Darmstadt, July 1st, 1742, and was his parents' eighteenth child. By his father, who was the pastor of the place, he was early initiated into mathematical and physical studies, in which he afterwards greatly distinguished himself, forming thereby a striking exception to the rule, that a mathematician, and wit, are the antipodes of each other. On the death of his father he pursued his studies, first at Darmstadt, afterwards at Göttingen, at which University he was appointed to a professorship in 1770. Although then only in his 27th year, he was well qualified for the office bestowed on him, such having been his assiduity that there was scarcely any branch of learning or science with which he was unacquainted. Just before his promotion he had made a visit to England, where he had the honour of being introduced to George III., and was noticed by the leading men of science in that day. The favourable reception he had met with induced him to pay a second visit to this country in 1774, preparatory to which he had made himself thoroughly master of our language. During this second residence among us, which was of some continuance, he was admitted into the highest literary circles. He also studied our national character with that shrewdness peculiar to him, and laid in that stock of information which he afterwards turned to such excellent account in his work on Hogarth.

From the period of his return to that of his death he resided constantly at Göttingen, devoted entirely to the duties of his professorship, to his pen and his studies. He latterly became subject to attacks of hypochondria, which induced him to lead the life of a recluse, without other society than that of an excellent wife and his five children. This malady however did not interrupt his studies, to which he continued as attached as ever, neither did it prevent his carrying on a very extensive epistolary correspondence almost to the day of his death, February 24th, 1799.

Besides the already-mentioned commentary on Hogarth (of which some specimens appeared several years ago in the 'London Magazine,' and from which there are also some extracts in the article entitled 'Lichtenberg and Hogarth,' *Foreign Quarterly*, No. 32), his other works are exceedingly numerous, and no less varied; for while some are entirely scientific, on subjects of astronomy and physics, others are pieces of wit and satire, frequently of the most pungent kind, and occasionally of the most extravagant and whimsical cast. Among these productions of humour the titles of one or two may be mentioned as conveying some idea of their subjects, viz. The Mad-house for Opinions and Inventions; A Sentimental Journey to Laputa; Consolation for those Unfortunates who are no Original Geniuses; A Patriotic Contribution to the Study of German *Methyology* (Drunkenness); and the Bedlamites' Petition.

LICHTWER, MAGNUS GOTTFRIED, born at Wurzen, in Saxony, January 30th, 1719, though only one of the minor poets of Germany, may be considered almost the first in the rank of its fabulists, in which character he holds a standard rank in the literature. When only two years old he lost his father, but his mother's circumstances enabled her to bestow upon him a good education. At her death, in 1737, the further charge of his studies devolved upon his guardian, the Stiftsrath Zahn, by whom he was sent to Leipzig, where he applied himself more particularly to jurisprudence, but also made himself master of French and Italian. In 1741 he went to Dresden, in the hope of there obtaining some office or appointment, but after fruitlessly waiting two years, quitted it for Wittenberg, where he obtained the degree of doctor of laws, and delivered lectures in jurisprudence, until the breaking of a blood-vessel compelled him to abstain from the exertion of speaking in public. He now took up his pen and produced his Fables, the first edition of which appeared anonymously in 1748. The following year he quitted Wittenberg, and went to Halberstadt, where his mother's brother was one of the dignitaries of the cathedral. This change proved highly advantageous to him, being the means of his obtaining some important charges. In 1758 he published a new edition of his Fables, with his name prefixed to it, and also his didactic poem 'Das Recht der Vernunft;' and in 1762 a 'Translation of Minutius Felix,' with notes. He died July 7th, 1783. The poem above mentioned is by no means equal to many others of the same class in the language: it is an exposition of Wolf's philosophy, formally treated, instead of the dryness of the subject being at all relieved or adorned by poetical illustration of the doctrine. His Fables, on the contrary, are master-pieces; many of them strikingly original in subject, terse and pointed in style, and admirable in their moral. They abound with gnomic sentences most happily and energetically expressed; and although some few are inferior to the rest, there is scarcely one which has not some particular merit to recommend it.

LICI'NIUS STOLO, LICINIAN LAWS or ROGATIONS. Caius Licinius Stolo, of a distinguished plebeian family at Rome, was made tribune of the people, together with his friend L. Sextius Lateranus, in the year 375 B.C. These tribunes brought forward three 'rogations,' that is to say, bills or projects of law, for the comitia or assembly of the tribes to decide upon:—1. That in future no more military tribunes should be appointed, but two annual consuls as formerly, and that one of the two should always be a plebeian. The occasional appointment of military tribunes, part of whom might be chosen from among the plebeians, was a device of the senate to prevent the plebeians from obtaining access to the consulship. 2. To deduct from the capital of all existing debts from one citizen to another the sums which had been paid by the debtor as interest, and the remaining principal to be discharged in three years by three equal payments. This seems, according to our modern notions of money transactions, a very summary and not very honest way of settling standing engagements; but if we carry ourselves back to that remote period of Roman society, and take into consideration the enormous rate of interest demanded, the necessities of the poorer citizens, who were called from their homes and fields to fight the battles of their country, and had no means of supporting their families in the mean time except the ruinous one of borrowing money from the wealthy, who were mostly patricians, and also the fearful power which the law gave to the creditor over the body of his debtor, and the atrocious manner in which that power was used, or rather abused, in many instances, such as those reported by Livy (ii. 23; vi. 14; viii. 28), we shall judge with more temper of the proposition of Licinius. The 3rd rogation has been a subject of much perplexity to modern inquirers. Its object, as briefly expressed by Livy, was that 'no one should *possess* (possideret) more than five hundred jugera (about 333 acres) of land, and until lately it has been literally understood by most readers of Roman history as fixing a maximum to private property. But Beaufort, and more lately Heyne, Niebuhr, and Savigny, have shown, that the limitation referred to the holding of land belonging to the *ager publicus*, or public domain of the state. [AGRARIAN LAW.] And when we reflect upon the insignificant extent of the original territory of Rome, and that it became gradually enlarged by the plunder or appropriation of a part of the land of the neighbouring nations, it appears evident that most of the large estates possessed by the patricians must have been portions of this conquered land, which was considered as public property, occupied, cultivated, and held as tenants at will, they and their descendants paying to the state a tenth of all grain, a fifth on the produce of plantations and vineyards, and a certain tax per head of cattle grazing on the public pasture. This was the kind of *possession* which the Licinian rogation purposed to limit and regulate. Licinius proposed that all those who had more than 500 jugera should be made to give up the surplus, which was to be distributed among those who had no property, and that in future

every citizen was to be entitled to a share of newly conquered land, with the same restriction and subject to the same duties. This might be considered as a bill for the better distribution of plunder among those engaged in a plundering expedition, for the land thus acquired and distributed cannot be compared to real property as held throughout Europe in our days, and this reflexion may perhaps serve to moderate somewhat the warmth of our sympathy in reading of the complaints of the Roman plebeians concerning the unequal distribution of land which had been taken by violence from a third party, the other nations of Italy, who were the real sufferers.

The patricians, who had had till then the best share of the common plunder, opposed the utmost resistance to the passing of these three laws. They gained over to their side the other tribunes, who put their veto on the bills. But at the end of that year Licinius and Sextius put their own veto on the election of the new military tribunes, and being themselves re-elected by the tribes every year, they renewed for five years the same opposition to the election of the curule magistrates, so that the republic fell into a kind of anarchy. In the fifth year, 370 B.C., the inhabitants of Velitræ, a Roman colony, revolted, made incursions into the Roman territory, and besieged Tusculum, the ally of Rome. Licinius and Sextius now waived their opposition, the comitia were held, and six military tribunes were elected, and as the war continued, six more were appointed in the following year, Licinius and Sextius meantime continuing to be re-elected every year as tribunes of the people. Having gained over to their side three more of their colleagues, they again brought forward their bills, asking the senators 'how they could pretend to retain more than 500 jugera of land, while a plebeian was only allowed two jugera, hardly enough to build himself a cabin upon, and to supply him with a burial-place when he died.' These expressions of Livy's text confirm Niebuhr's opinion that the whole question was about the ager publicus, or conquered land, of which the plebeians who had served in the army received small allotments of two or more, but never more than seven, jugera (between four and five acres) each. Licinius then went on to ask the patricians, who still opposed his other bill concerning the debtors, 'whether they delighted in having their houses full of plebeians in fetters, so that wherever a patrician dwelt there must be a private dungeon also?' And then turning to the plebeians, he told them that the surest remedy for such evils was contained in his third bill, namely, that they should always have one of the two consuls chosen from their own body. 'It is not enough,' said he, 'that plebeians be eligible by law to the consulship. They have long been eligible to the dignity of military tribunes, and yet the patricians have so contrived that very few plebeians have obtained that office. The number of military tribunes at their first institution was ordained to be six, in order that the plebeians might have a share in that magistracy; nevertheless their claims have been almost constantly defeated; how much easier it will be for the patricians, as there are but two consulships, to secure them both for themselves. The only remedy therefore is to make a law that there shall be always one plebeian in the consulship.' However, all proceedings concerning these laws were again suspended for that year, the five tribunes of the people who were still in the interest of the senate urging that it was proper to wait for the return of the army, which was still in the field against Velitræ. Six new military tribunes were elected for the following year, 368 B.C. At the same time Licinius and Sextius, being re-elected tribunes of the people for the eighth time, resolved to bring their bills before the tribes, without any regard to the intercession or veto of their colleagues.

The senate, seeing the final struggle approaching, had recourse to a last expedient: they appointed Camillus to the dictatorship. While Licinius and Sextius, having convened the tribes, sure of the people's favour and regardless of the veto of their colleagues, were proceeding to take the suffrages, and the first tribes had already voted for the bills, the dictator, attended by a great body of the patricians, repaired to the place of assembly, and declared that he was come to support the rights of one part of the tribunes to put their veto on the proceedings of the others; and as Licinius and Sextius paid no attention to him, Camillus ordered the lictors to disperse the assembly, threatening, in case of noncompliance, to summon the people to the Campus Martius, to enlist and march into the field. This put a stop to the voting. Licinius and Sextius then preferred a bill that M. Furius Camillus should be fined 500,000 ases, to be sued for as soon as he laid down his office, for interrupting the tribes in their right of legislating. Camillus now bent before the storm and abdicated his office. It appears that Licinius and Sextius, having assembled the tribes anew, might have passed the two bills concerning the land and the debtors, but that the people demurred to the law concerning the consulship, in which most of them felt little interest. The two tribunes however refused to separate the three bills, telling the people that they must either have all or none; and they added, that unless they agreed to pass the three bills, they, the two tribunes, were determined to serve them no longer in their office after that year. They consented however to be re-elected, and soon after obtained the passing of another bill, by which the custody of the Sibylline books, instead of being entrusted to two patricians as heretofore, should be entrusted to decemviri, half of whom were to be always plebeians. They then suffered six patricians to be elected military tribunes for the following year, 366 B.C. In that year the Gauls having again advanced towards Rome, Camillus, now nearly 80 years of age, was appointed dictator for the fifth time, and marching out of Rome completely defeated the barbarians. On his return he obtained a triumph, with the consent of both senate and plebs. Livy (b. vi., 41) here becomes extremely laconic, merely saying that the external war being concluded, the internal contest raged more violently than ever, and that after a desperate struggle the dictator and senate were defeated, and the three rogations or bills of the tribunes were allowed to pass. Plutarch, in the life of Camillus, gives some further particulars of a great tumult in the Forum, when Camillus was nearly pulled down from his seat; being protected by the patricians, he withdrew to the senate-house; but before entering it, turned towards the capitol and besought the gods to put an end to these commotions, vowing to build a temple to Concord, if domestic peace could be restored: and it appears that it was he who persuaded the senate to comply with the wishes of the plebs. Thus the three Licinian rogations passed into law after a struggle of ten years, which is remarkable for the orderly and legal manner in which it was carried on, and for the perfect temper and judgment shown by the two popular tribunes.

Sextius Lateranus, the colleague of Licinius, the first plebeian consul, was chosen for the next year, 365 B.C., together with a patrician, L. Æmilius Mamercinus. The senate however refused to confirm the election of Sextius, and the plebeians were preparing for a new secession and other fearful threatenings of a civil war, when Camillus again interposed, and an arrangement was made that while the patricians conceded the consulship to the plebeians, the latter should leave to the patricians the prætorship, or office of supreme judge in the city of Rome, which was then for the first time separated from the consulship. Thus was peace restored.

Licinius, the great mover of this change in the Roman constitution, was raised to the consulship, 363 B.C., and again in the year 360 B.C., but nothing remarkable is recorded of him while in that office. In the year 356 B.C., under the consulship of C. Marcius Rutilus and C. Manlius Imperiosus, we find Licinius charged and convicted before the prætor of a breach of his own agrarian law, and fined 10,000 ases. It seems that he possessed 1000 jugera, one half of which he held in the name of his son, whom he had emancipated for the purpose. After this, we hear no more of C. Licinius Stolo.

(Livy, vi. and vii.; Niebuhr, *Römische Geschichte*, vol. iii.; Val. Maximus, viii., 6, and Savigny's remark, *Das Recht des Besitzes*, p. 175, on his blunder about the story of Licinius violating his own law.)

LICI'NIUS, FLA'VIUS VALE'RIUS. [CONSTANTINUS; DIOCLETIANUS; GALERIUS; MAXIMINUS.]

LI'CINUS (Latreille), a genus of Coleopterous insects included in the great group Carabus of the older authors. The genus *Licinus* is placed by Dejean in his section *Patellimanes*, and, together with the genera *Dicælus*, *Rembus*, and *Badister*, constitutes a little section or subfamily, distinguished from other Patellimanes by the want of the toothlike process in the emargination of the mentum.

In the genus *Rembus* (Latreille) the three basal joints of the anterior tarsi are dilated in the male sex: the terminal joints of the palpi are elongated, somewhat ovate, and truncated at the apex; the mandibles project but little, are

slightly arched, and pointed; the thorax is narrower than the elytra, which are almost parallel.

But two or three species of this genus (the *Carabus politus*, and *C. impressus* of Fabricius) are known; they are found in the East Indies, and are of a black colour.

Genus *Dicœlus* (Bonelli) may be distinguished by the following characters: terminal joint of the palpi securiform; labrum emarginated and having a longitudinal impression; mandibles projecting but little, without internal denticulations, slightly arched and pointed; thorax nearly square; elytra moderately long, parallel or somewhat ovate; the three basal joints of the anterior tarsi are dilated in the male sex. The species of Dicœlus appear to be confined to North America, and about twelve or fifteen are described. They are in general of a tolerably large size, averaging perhaps about three-quarters of an inch in length, or rather less. Some of the species are of a beautiful purple or bluish tint; they are however most commonly black.

Genus *Licinus*. In this genus the head is broad, short and rounded; the thorax is generally of a rounded form, and the body depressed and ovate; the labrum is short, and emarginated in front; the terminal joint of the palpi is securiform; the mandibles are stout, short, obtusely pointed, and dentate internally; the two basal joints of the anterior tarsi are dilated in the male sex. In Dejean's *Catalogue des Coléoptères* there are twelve species of the present genus enumerated, nearly all of which inhabit Europe. Three species inhabit this country. (Stephens's *Illustrations of British Entomology*.)

The genus *Badister* (Clairville) is distinguished by the mandibles being short and obtuse; the three basal joints of the anterior tarsi dilated in the male sex; the terminal joint of the palpi elongated, oval and somewhat pointed; the head rounded, and the thorax cordiform. Of this genus five species are enumerated by Dejean, all of which inhabit Europe. Their small size however renders it probable that very many more will be discovered; already as great a number as that given by Dejean has been found in this country, some of which are certainly unknown to that author. The genus *Trimorphus* of Mr. Stephens appears not to be sufficiently distinct from *Badister*.

LICKS, as they are called in North America, are small tracts of land with a sandy soil, on which salt crystallizes in the form of an efflorescence, and which are resorted to by all animals that feed on grass, for the purpose of licking up the salt. They are of great importance in Brazil, where they are called *Carreiros*. That country being comparatively newly settled, the herds of cattle are very large, and sometimes amount to nearly 50,000 head. These cattle grow lean and are reduced to bad condition if they cannot from time to time get salt, which they lick with great eagerness. When a cattle estate has no natural licks, the proprietor is put to considerable expense to provide the necessary quantity of salt for his cattle. Hence the value of a large estate is greatly enhanced by the possession of one or more licks, though in general they hardly occupy a space twenty paces long and wide. Wild animals, as deer, buffaloes, wild hogs, &c., also resort to them.

LICTOR, a public officer who attended on the principal Roman magistrates. This office is said to have been derived by Romulus from the Etruscans. (Liv., i. 8.) The kings, and afterwards the consuls, were attended by twelve lictors, the dictator by twenty-four, and the master of the horse by six. The lictors went before the magistrates one by one in a line; he who went first was called *primus lictor*, and the one who immediately preceded the magistrate *proximus lictor*.

The lictors were originally chosen from the *plebs* (Liv., ii. 55); but in the time of Tacitus they appear generally to have been freedmen (*Ann.*, xiii. 27), probably of the magistrate on whom they attended.

The duty of the lictor was to see that proper respect was paid to the magistrates, and to inflict punishment on those who were condemned; and probably to assist in some cases in the execution of a decree or judgment in a civil suit.

The lictors carried on their shoulders rods bound in the form of a bundle, with an axe in the middle.

The etymology of the name is doubtful. Gellius (xii. 3) derives it from the verb *ligare*, because the lictor had to bind the hands and feet of criminals before they were punished.

LICUALA, a genus of Palms of the tribe Coryphinæ of Martius, so named by Rumphius, from the Macassar name of the species *L. spinosa*, figured by him in 'Herb. Amboin.,' i. t. 9, and which is found in the islands of Macassar and of Celebes. Another species, *L. peltata*, is described by Dr. Roxburgh as a native of the mountainous and woody parts near Chittagong, which separates that province from the Burman territories. Both species are small, with palmate somewhat fan-shaped leaves, but of little use. Rumphius describes the narrow leaves of his tree as being formed into pipes for smoking tobacco, while the broader are employed for wrapping up fruit, and for other domestic uses.

LIECHTENSTEIN, a sovereign principality, the smallest of all the states composing the German Confederation, consists of the counties of Schellenberg and Vaduz, and is situated between the Rhine, Switzerland, and the Tyrol, on the northern slope of the Rhætian Alps, the highest summits of which rise to an elevation of 5610 feet. Its area is only fifty-two square miles, with a population of nearly 6000 inhabitants, all of the Roman Catholic religion. The country is very mountainous; but it produces corn, flax, wine, fruit, and timber, sufficient for the consumption of the inhabitants, who have also a good breed of horned cattle. They are a poor but happy little community, who subsist by agriculture, cotton-spinning, and manufactures of wooden wares. The revenue is 5000 florins per annum, all of which sum is applied to the public service; the prince's private domains produce a revenue of 17,000 florins. Liechtenstein, together with the principalities of Hohenzollern, Reuss, Lippe, and Waldeck, is considered as the sixteenth member of the diet, but in the full council each of them has a vote of its own. Its contingent to the army of the Confederation is 55 men, and its contribution to the treasury 250 florins per annum.

Though the prince of Liechtenstein, as a sovereign, has a smaller territory than any other of the German princes, he possesses in the Austrian empire mediatised principalities and lordships of great extent, which comprise the principalities of Troppau and Jagerndorf in Upper Silesia, and vast estates in Moravia, making together an area of 2200 square miles, with a population of 360,000 inhabitants, and yielding to the prince an annual revenue of 1,500,000 florins. The prince, who is the head of the second or younger branch, has lordships with 60,000 inhabitants, and a revenue of 300,000 florins. The house of Liechtenstein is one of the most ancient and illustrious in Europe; it is believed to have a common origin with the house of Este; and the history of Austria, for seven centuries, exhibits a splendid list of its members eminent in the cabinet and the field, such as few other families in Europe can boast. (*Oesterreichische National Encyclopédie*; Hassel; Stein; &c.)

LIEGE (in German, *Lüttich*; in Dutch, *Luik*), a province of the kingdom of Belgium, is bounded on the north by Limburg, on the east by Prussia (province of the Rhine), on the south by Luxemburg, and on the west by Namur and South Brabant. It is composed of part of the former bishopric of Liege and of the duchies of Luxemburg and Limburg, and of the county of Namur; also the county of Dalhem, the abbey lands of Stablo, and several villages known by the name of Terres de Redemption. Its area is about 2150 square miles. The smaller and northern portion is hilly and undulating; the southern is mountainous. The Ardennes cover a great part of the province, especially about Marche and St. Hubert. The soil differs much in quality. On the west side of the Maas, and on the east side towards Limburg, the plains, valleys, and low hills are fertile and well cultivated; on the east side of the Maas, where it is joined by the Ourthe, especially towards Luxemburg, the soil is rocky and stony. In this part of the province there are extensive forests. The principal river is the Maas, which comes from Namur, and forms at first the boundary between the two provinces. After receiving the Ourthe, it flows between high, steep, and often perpendicular rocks to Liege, where it becomes broader, and enters the province of Limburg. The climate is on the whole healthy: in the northern part it is temperate, and generally damp; in the southern parts the air is more keen and the winter more severe and longer. The country produces some corn and a little wine, resembling the middle kinds of champagne and burgundy; the pastures are good, and maintain great numbers of horned cattle and sheep; the flesh of the sheep is excellent, but the wool of inferior quality. The mineral wealth of the country is considerable; there are mines of calamine, alum, lead, and iron-ore; but the most valuable product is coals, of which half a million of tons at least are annually raised, and the quantity must be constantly in-

creasing, as not a week passes without applications to government for leave to open fresh mines. Of the mineral waters, those of Spa are the most celebrated. The manufactures of the province are very important. The vast establishments of Messrs. Cockerell at Seraing and Liege for the manufacture of spinning and other machines, of steam-engines, and the apparatus for the iron railroads, &c., are well known throughout Europe; and the fine cloths of Verviers and other towns enjoy the highest reputation. The population of the province is stated at 371,000 inhabitants.

The province of Liege was formerly a bishopric belonging to the circle of Westphalia; the bishop, who was under the archbishopric of Cologne, was a prince of the empire, and had also the title of duke of Bouillon. The revenues exceeded 100,000*l.* sterling. In 1789 an insurrection broke out; and the bishop at first granted the demands of the discontented, but afterwards withdrew to Germany; the chamber at Wetzlar annulled the agreement made by the bishop, and caused him to be reinstated by force of arms. The French however took possession in the same year, and retained the country till the overthrow of Napoleon, after which it was united with the kingdom of the Netherlands.

LIEGE, the capital of the province, lies in 50° 39′ N. lat. and 5° 31′ E. long. It is situated on the Maas, in a pleasant well cultivated valley between two hills, the higher of which, called St. Walburg's Mount, is on the north side, and is the site of the new citadel, which is very strong and built on a new plan. The Maas is joined in the valley by the Ourthe and other smaller streams, and on entering the city divides into several branches which form islands, bordered by handsome quays and connected by 17 bridges. Liege is divided into the old and the new town, and has besides ten suburbs. It is a large but by no means a handsome city. Most of the streets are very narrow, many of them being hardly six paces wide, and as the houses are generally high, the streets are very dark, and without that cleanliness which is general in the Netherlands. Some parts have broad streets, good squares, and promenades, but on the whole it is an ill built town. The city was formerly fortified, but at present is defended only by the new citadel and a great outwork on the west side. The most remarkable buildings are the cathedral, built in the eighth century; the town-hall, a large but heavy edifice; the theatre; and the university, which was founded in 1817, and has about 400 students. The university has a good library, a chemical laboratory, a botanic garden, a cabinet of natural history, &c. Liege before it fell into the power of the French had 40 churches, 44 convents, 10 hospitals, and an establishment of the Beguines, some of which have been suppressed. There are an academy of arts and sciences, a gymnasium, and numerous charitable and useful institutions. Very important manufactures are carried on here. The most celebrated are those for fire-arms, which make muskets at all prices, from one crown to 500 louis d'or a piece. There is a great cannon foundery, a zinc manufactory, one of files and anvils, and many manufactories of nails, which latter employ many thousand workmen. The woollen cloths are of excellent quality, and the tanneries have long been famous. The population is 59,600. The inhabitants are very industrious, and have a considerable trade in colonial produce and manufactured goods, as well as in coals and other productions of the province, of which great quantities are exported.

LIEGNITZ, one of the three governments into which Silesia is divided, comprises the most north-westerly part of that province, and that part of Upper Lausitz which is now part of Prussia. Having been enlarged by the incorporation of five circles of the former government of Reichenbach, and the largest part of Spremberg-Hoyerswerda, it now consists of nineteen circles. Its area is 5270 square miles, and the population, which, by the census of 1831, was 766,170, and by that of 1834, 798,082 inhabitants, had increased, by the end of 1837, to 844,281.

Goldberg, situated on an eminence on the banks of the Katzbach has double walls and four gates: the population is 7098. Grünberg, a walled town, with three gates, has 9963 inhabitants: both these towns have flourishing manufactures of woollen cloths. Lauban, on the Queis, a walled town, with four gates, has 5500 inhabitants, who have manufactures of calico and linen. Sagan, near the Bober, is a strongly fortified town, with three gates, a very fine ducal palace with a beautiful park, one Lutheran and five Roman Catholic churches, and manufactures of woollen cloth, linen, stockings, lace, and looking-glasses. The population is nearly 6000.

LIEGNITZ, the capital of the circle and of the government of the same name, is situated in 51° 12′ 30″ N. lat. and 16° 12′ 15″ E. long., at the conflux of the Schwarzwasser and the Katzbach. The population amounts to 11,674. The inner town is surrounded with a moat and earthen rampart, which is laid out in public gardens with fine avenues of lime, mulberry, and chesnut trees, and has four gates, but it is not a fortified place. The antient palace of the princes is in the town, and is surrounded by a separate moat and high wall. There are two Lutheran and two Roman Catholic churches, of which that of St. Peter and St. Paul has a large library, and that of St. John contains the magnificent chapel where the old princes of Liegnitz and Brieg were interred. Among the public institutions are a Lutheran gymnasium, with nine professors, eight Lutheran schools, two hospitals, a Catholic orphan asylum, and a Bible society. The Royal Equestrian Academy is a magnificent building like a palace; it was founded in 1708 by the emperor Joseph I., for the sons of Silesian gentlemen, Protestants as well as Catholics, and was remodelled in 1810 for the education of children of the upper classes of society, with five professors. It has a good library, mathematical and other instruments, collections of natural history, &c., and considerable revenues. Liegnitz has manufactures of woollen cloths, linen, cotton, silk, stockings, tobacco, starch, &c., and great breweries. In the suburbs and environs great quantities of fruit and vegetables are grown. Liegnitz has a theatre and other places of public recreation, and it is reckoned the most agreeable residence, after Breslau, in all Silesia. Frederick II. defeated the Austrians under Marshal Laudon between this town and Parchwitz in 1760. In the vicinity is Wahlstatt (which word means 'the battle-field'), where the celebrated battle with the Mongol Tartars was fought in 1241, in which Frederick, duke of Liegnitz, lost his life; and between this place and Bichelwitz on the Katzbach, Blücher, together with the Russians, defeated the French under Macdonald and Ney in 1813, whence he obtained the title of Prince Blücher of Wahlstatt.

LIEN (from the French *lien*, 'a tie,' or 'band'). Various definitions have been given from the bench of this juristical term, but many of them are either incomplete, or too general because of comprehending other rights besides those of lien. The following definition is perhaps as correct as any that has proceeded from the judges:—'A lien is a right in one man to retain that which is in his possession belonging to another till certain demands of him, the person in possession, are satisfied.' (Grose, J., in *Hammond* v. *Barclay*, 2 East, 227.) The definition therefore includes possession by the party claiming the lien; and an unsatisfied demand by him against the owner of the property; but it does not show wherein this right to retain another man's property differs from the right of a pawnee or pledgee.

The determination of what shall be possession sufficient to constitute one element of lien is a part of the general doctrine of possession. It follows from the definition that if the party claiming the lien has not possession, he can have no lien; and as a general rule, if he has voluntarily parted with possession he has lost his lien. What shall be a parting with possession sufficient to cause a loss of lien is also to be determined by the general doctrine of possession. When possession of the thing is regained, the lien does not revive if the possessor gets the thing back under any circumstances from which a different contract may be implied from that under which he originally obtained the lien.

The defect of the above definition in not showing wherein consists the difference between lien and pledge leads to the consideration of the way in which the right called lien arises. It has been said that 'liens only exist three ways either by express contract, by usage of trade, or where there is some legal relation.' (Bayley, J., 1 Ba. and Ald., 582.)

When lien arises by express contract, it is either simply mortgage, pawn, or pledge, which are then the more appropriate terms; or it is an agreement (such as may exist in the case of principal and factor) that goods entrusted by one person to another for the purpose of sale, or for some other purpose than pledge, may be retained by the party entrusted with them, as a security for any debt or balance due to him from the other; or it is an agreement that he may retain the proceeds of things entrusted to him to sell, for the same purpose. Pawn or pledge is the tradition of a thing by the

owner to the pawnee, to be held and retained by him as security for a debt due from the owner to the pawnee; and it is a matter of express contract. Lien by contract differs from pawning or pledging in this, that in the former the retaining the thing is not the purpose for which the goods are delivered by the owner. In pawn or pledge goods are received in order to be retained and kept; in lien by contract they are delivered by the owner for some other purpose, but may be retained as a security for a debt due from the owner to the person to whom he has delivered his goods.

Where two parties have so dealt with one another that one has claimed and the other has allowed the right of lien in respect of any their mutual dealings, lien may exist in all cases of like dealings between them, if there be no verbal or written agreement to the contrary. The acts of the parties are here the evidence of the contract, which is as express as if made by formal words.

The 'lien by usage,' and 'that where there is some legal relation between the parties,' belong to one class, and are not distinguishable. They are both included under liens which do not arise from express but from implied contract. Lien may be defined as *primâ facie* a right accompanying the implied contract. (Lord Eldon.) The 'usage of trade' is merely evidence from which contract is to be implied: parties who mutually act in conformity to a custom have in effect, though not in form, made a contract. The term 'legal relation' is only another mode of expressing the mutual rights and duties of the same parties, who by their acts have brought themselves within the limits of a custom, and so given evidence of an intention to make a contract. Thus an innkeeper has a lien upon the horse of his guest, which he takes into his stable to feed; a carrier has a lien on the goods which he carries; a tailor who is employed to make a suit of clothes has a lien on them for the price of his labour, if the cloth be given to him for the purpose of making the clothes, and if he furnishes the cloth, and his customer, after the clothes are made, agrees to have them, and so obtains the property in them, the tailor has still a lien on the clothes, or any part of them, for the whole price. The contract in these and similar cases is for payment of money on one side, in consideration for certain acts to be done on the other; and the delivery by one party of his property to the other, who is to do some act to it, or in respect of it, for money, implies a payment of the money before the owner's right to repossess the thing can commence. Where the owner never had the property or possession of the raw materials, but acquires the property in a thing by his bare assent, as in the case just mentioned, the tailor's prior right of property is converted into a mere right to hold till his debt is paid, or, in other words, instead of property he has a lien. If the owner of a thing sells it, and agrees to receive the price at a future day, he cannot retain the thing till the day of payment, for he has, by the form of his contract, excluded himself from such right to a lien.

The foundation of all lien, where there is no express contract, is in custom; and the custom becomes law when it is confirmed by a competent authority. When many customs of lien have thus become law, other cases of claims of lien are also established as law in like manner, simply from analogy to the liens originating in custom.

Lien, unless there be an express contract, or a custom to the contrary, must from its nature be *particular*, that is, must have reference to a particular transaction and to a particular thing. When it is *general*, that is, where the right to retain a particular thing is not limited to a particular transaction, but exists with respect to other transactions also, there must be express contract, or the dealings of the parties must be such as to create that implied contract which arises from acts done in conformity to well-known usage.

Lien, when it exists, may be lost by voluntarily parting with the thing, by express agreement, or by agreement to be implied from acts. In general, when a person has a lien for a debt, he waives it by taking security for the debt. A solicitor has a lien for his bill on his client's papers which come into his possession in the course of transacting his business; but if he accept a security for his debt, he can be legally compelled to give up the papers. From the expressed agreement for a special security there necessarily arises the implied agreement to give up the thing which is retained, the acceptance of such special security being equivalent to an agreement to receive the debt or demand at a future day, and such agreement as to future payment being inconsistent with the retaining the thing, which act of retaining is equivalent to a claim for present payment. A factor, who has a lien on goods in his possession, both for his outlay on or with respect to those goods and for his general balance, loses his lien if he enters into an express contract for a particular mode of payment. If usage of trade and acts in conformity to it can be considered as evidence of a contract that goods shall be retained by one person as a security for a debt or balance due to him from another, an express contract for securing payment of such debt or balance must be considered as inconsistent with the implied contract, and therefore as determining it.

In Equity, the vendor of an estate, though he has executed a conveyance and parted with the possession without being paid, still has his estate as a security for such part of the purchase-money as is unpaid. This security is generally, though not with strict propriety, called the vendor's lien. The ground of this so-called lien lies in the nature of the contract: one party contracts to give land for money, and the other contracts to give money for land. Until both parties have performed their engagement, the land and the money cannot be considered as exchanged.

The equitable mortgage which is created by a deposit of title-deeds as a security for a debt is sometimes, though not with strict propriety, called equitable lien. By this deposit the depositor's interest in the lands to which the deeds relate becomes a security for the debt.

Lien, from its nature, is incapable of transfer; and in this respect it differs from a thing pledged, which can be assigned by the pledgee to the extent of his interest in it. Generally a lien gives no right to sell, except by particular custom. Where a factor who has a lien on the goods of his principal pledges them for a loan of money, this is no transfer of the lien: the goods are a pledge or pawn in the hands of the lender, who may hold them as a security for his advance to the amount of the factor's lien. The lender may have a right to retain the goods as a security to precisely the same amount as the factor; but his right to retain flows from a different source.

The practical questions which arise under the general doctrine of lien are numerous, and sometimes not easy of solution; many of them are of the greatest importance to the mercantile community. For further information the reader may refer to the articles AGENT, ATTORNEY, BAILMENT, CARRIER, and FACTOR, and to Montagu *On Lien*, for a collection of a considerable number of particular instances.

LIEOU-KIEOU ISLANDS, also called **LOO-CHOO**, constitute the most important of the several groups of islands which, though situated at considerable distances from one another, form a marked chain of connection between the Japanese island of Kioosioo and the Chinese island of Formosa. They lie between 24° 10′ and 28° 40′ N. lat. and 127° and 129° E. long., and are said to consist of thirty-six islands, of different but rather small dimensions. The largest of them, called great Loo-choo, and sometimes Doo-choo, by the natives, is very nearly sixty miles long in a north-east direction, and preserves a tolerably uniform breadth of about ten or twelve miles. The surface of these islands is mostly uneven and rugged, but the elevations do not attain a great height. The highest of the hills, Onnodake Mount, measured by Captain Beechey, does not attain 1100 feet above the sea. They seem to be of volcanic origin, but no active volcano has been observed in them. The lower tracts are of great fertility, but the most elevated are generally bare and rarely covered with wood. The fertile tracts are in high cultivation. Captain Beechey mentions sweet potatoes, millet, wheat, Indian corn, rice, potatoes, cabbages, barley, the sugar-cane, cotton, peas, tea-shrubs, tobacco, capsicums, cucumbers, cocoa-nuts, carrots, lettuces, onions, plaintains, pomegranates, and oranges, as growing on these islands. Their agriculture resembles that of the Chinese, particularly as to manuring and irrigating the ground. Along the sides of the hills and around the villages the bamboo and rattan grow to a considerable size. The pine-trees grow to a great height and size, and the banyan-tree is also common. Cattle are not abundant, and are only employed for agricultural purposes. Milk is never used; hogs, goats, and poultry, with rice and other vegetables, form the food of the inhabitants. They have no sheep nor asses; their horses are of a small slight make, and used for riding and carrying loads. The climate is very mild, these islands being situated within the range of the trade-winds. The inhabitants more resemble

the Japanese than the Chinese; they are rather low in stature, but are well formed, and have an easy graceful carriage; their colour is mostly of a deep copper, but varies considerably in individuals; their hair, uniformly black, is glossy, but not so smooth and straight as that of the Chinese; their eyes are usually of a dark grey. Gentleness and simplicity characterize them all. Their language is similar to the Japanese. Gutzlaff remarked that the difference between the two languages was similar to that between High and Low German. They are acquainted with the Chinese written characters, at least the better educated classes. They seem to have made considerable progress in several branches of manufacturing industry, and prepare salt from sea-water in an ingenious manner. They have doubtless some commerce with China and Japan, but nothing precise is known respecting its extent nor the articles which are exported or imported. It would seem that sugar, salt, and sulphur are the most important articles which are sent out. The principal commercial town of Great Loo-choo is Napakiang, or, as Captain Beechey calls it, Nepa Ching, which has a good and safe harbour, and is considered the capital of the islands; but Captain Beechey thinks that the town of Shui or Shoodi is the capital and residence of the king. It is situated farther inland, on a hill, and surrounded by a wall, but has never been visited by Europeans. The stay of no European vessel in these islands has been long enough to enable us to ascertain their degree of dependence either on China or Japan, whether the sovereign is subject to one of these countries, or entirely independent and only sends some presents to the court of Peking or Yeddo, which seems the most probable. (Capt. Basil Hall's *Voyage of Discovery to the West Coast of Corea and the Great Loo-choo Island;* Capt. Beechey's *Voyage to the Pacific and Behring's Strait;* and Parker's *Journal of an Expedition from Sincapore to Japan.*)

LIER (*Lierre*, Fr.), a considerable town in the kingdom of Belgium, in the province of Antwerp, is situated in 51° 9′ N. lat. and 4° 37′ E. long., at the conflux of the Great and the Little Nethe, which after their junction are called simply the Nethe. It has eight churches, the chief of which is a handsome edifice, an hospital, and a Beguinage. The inhabitants, who are 13,000 in number, carry on various manufactures of linen, lace, woollens, cotton yarn, &c. Calico-printing is likewise carried on to some extent. The distilleries and breweries are numerous. Rape seed is grown in great quantities in the adjacent country, and there are many oil-mills in this town.

LIEUTENANT is an officer who discharges the duties of a superior, in his name and during his absence; and who acts immediately in subordination to him when he is present. Thus, in military affairs, the lieutenant-general and the lieutenant-colonel respectively superintend the economy and the movements of the army and the battalion under those who hold the chief command. The lieutenant of a company is also immediately subordinate to the captain, in whose absence he has the same powers. In the British service the lieutenants of the three regiments of foot-guards have the rank of captain: in the royal regiment of artillery, the royal corps of engineers and marines, and also in the rifle brigade, there being no ensigns, the subaltern officers are distinguished as first and second lieutenants.

In Ward's 'Animadversions of War' (1639), it is said, 'A lieutenant is an officer of high credit and reputation, and he ought in all respects to bee well indoctrinated and qualified in the arts military, and not inferior in knowledge to any officer of higher authority; for an unskilful captaine may better demeane himselfe with an experienced lieutenant than an unskilful lieutenant can fadge with a skilful captaine.'

The price of a lieutenant's commission is, according to the present regulation,—

	£			s.	d.
Life-Guards .	1785	.	daily pay	10	4
Horse-Guards .	1600	.	daily pay	10	4
Dragoons .	1190	.	daily pay	9	0
Foot-Guards .	2050	.	daily pay	7	4
Line . .	700	.	daily pay	6	6

A lieutenant in the royal navy takes rank as a captain in the army, and the number appointed to ships of war varies with the rate of the latter. A ship of the first rate has eight lieutenants, besides supernumeraries; those of the second, third, &c. rates, have respectively one less than the number appointed to the preceding rate; so that a sixth-rate vessel has three; sloops and bomb-vessels have only two. The monthly pay of a first-lieutenant of seven years' standing, in ships of the three first rates, and that of lieutenants commanding gun-brigs, schooners, and cutters, is 11*l.* 10*s.* The monthly pay of other lieutenants, for ships of all rates, is 9*l.* 4*s.*

LIEUTENANT-GENERAL. [GENERAL.]

LIEUTENANT, LORD and DEPUTY. [LORD-LIEUTENANT.]

LIFE. Organic matter, in which alone the phenomena of life are cognizable to our senses, is distinguished from common or inorganic matter by several peculiarities of composition and structure. Twenty elementary substances occur in organic matter, viz. oxygen, hydrogen, nitrogen, carbon, phosphorus, sulphur, iodine, bromine, chlorine, fluorine, potassium, sodium, calcium, magnesium, silicium, aluminium, iron, manganese, copper, and (Devergie, *Annales d'Hygiène*) lead. But although the elementary substances of which organic matter is composed are the same as those of common matter, their mode of combination is peculiar. In minerals, the elements are generally united in pairs, or according to a binary mode of combination; but in organic matter, three at least, and usually four elementary principles are combined in each simplest substance or proximate principle. In organic compounds again, the elements are not generally united in any simple ratio one to another, as 1 atom of one to 1, 2, or 3 of another, as in inorganic bodies, but several (as 10 or 12 of one) are united with several of each of the others to form one compound atom. Thus while the relative atomic proportions in which the different elements unite are the same in both classes of bodies, and while the laws of definite proportions, and of combination according to fixed numbers or simple multiplies of them, ascertained from the analysis of inorganic, are applicable in the study of organic bodies, yet there results from the number of elementary substances, and the number of atoms of each which unite in each atom of the organic compound, this important circumstance, that from a few elementary substances (scarcely more than one-third of those known) an indefinite number of different compounds are formed. Of the twenty above mentioned, the first three almost alone form the proximate principles of vegetables, and the first four those of animals. They are therefore called essential elements; while the others, occurring in very small quantities and according to no general rule, are called incidental elements.

In respect of structure, it is observed that all organic bodies, plants as well as animals, have a more or less rounded and cylindrical, branched or membered form, bounded by curved lines, and by convex or concave surfaces very distinct from the crystalline, the only regular form of inorganic matter. They are composed of heterogeneous substances and parts, containing in all cases both solid and fluid substances. They have a peculiar softness and flexibility dependent on the mixture of their fluid with their solid parts; their character thus varies in different situations, and is as entirely distinct from the firmness of inorganic solids, as from the incoherence of parts in inorganic fluids. They are composed of particles which when examined by the microscope have for the most part a rounded or globular form, beyond which they do not appear to be mechanically divisible. These elementary particles, united in a variety of ways, form the basis of the different animal and vegetable tissues, of which again are formed the several organs, whose assemblage constitutes the perfect organic being. It need scarcely be said, that this composition of different parts of the same body from different materials is the very opposite of the homogeneous nature of the minutest particles of an inorganic body, and of the similarity which every part of it bears to the whole.

All the parts of an organic body are, both in their origin and in their continuance, more or less dependent upon one another. In their original formation, the production of one part induced that of another; and when formed, the action of one influences the actions of all the others. Thus the solids, being regenerated from the fluids, require them to be duly formed, that they may themselves be duly maintained; while the due formation of the living fluids in its turn depends mainly on the healthy action of the solids. The forms of organic bodies undergo varied alterations in the process of growth, at different periods and according to certain laws, which are differently modified for each species. The production of new beings depends on the exercise of certain functions belonging to those already existing. The

maintenance of each organic being is accompanied by a constant change of its material composition, dependent on a mutual relation between it and the external world.

This maintenance of the living being, during a certain length of time, by the mutual changes which take place between it and the external world, is the most general phenomenon observed in organic bodies during life. It is a compound process, consisting, 1st, of the reception of materials from the external world, as nutriment, which is taken up by absorption and carried on by a peculiar motion in vessels, or through the interstices of the tissues. 2nd, Attraction of aeriform substances from without, and separation of other aeriform substances from within, constituting respiration. 3rd, Conversion of the nutriment and aeriform substances imbibed, into the peculiar fluids of the body—assimilation; 4th, The motion of these fluids through the body by a circulation or other means. 5th, Conversion of these fluids into a solid form, or the combination of them with the solids, so as to maintain the peculiar properties of the latter, constituting nutrition properly so called. 6th, The preparation and separation of fluids of peculiar kinds from the assimilated fluids, or the formation of secretions. These processes, which are called the nutritive functions, occur, in a more or less distinct manner, in all living bodies, plants as well as animals, and are essentially characteristics of Life, to which nothing analogous is ever observed in inorganic bodies.

Besides these, the functions of the organic life, common to all living beings, there occur in animals peculiar processes, the functions of animal life, by which they receive impressions from external objects in the various sensations, and in their turn act upon external things by voluntary motions.

The functions above enumerated relate exclusively to the maintenance of the individual, and to its preservation from the influence of external agents, which, as soon as these functions cease to be performed, act upon it, according to the same laws as upon common dead matter, and by the processes of fermentation and putrefaction destroy all the characters of organization in it. Other functions not less distinctly characteristic of life are, the production of new individuals from parts separated by vital or mechanical processes from the parents in generation, and the peculiar modifications of the nutritive processes by which the development of the embryo, the growth of the young being through the various changes of increasing years to old age, and its passage thence to natural death, are effected.

LIFE, MEAN DURATION OF. This is commonly called the *expectation* of life, which, properly speaking, it is not. Of a thousand lives of equal goodness, any one may expect to live as long as he has an even chance of living, that is, till 500 are extinct. This period has been denominated the *probable* life.

The mean duration of life, or the number of years which, one person with another, are enjoyed by individuals of a given age, is found from the tables of mortality, which give, out of a certain number born, the number who are left at every successive birthday. If the absolute average law of human life were given, and if $\phi x dx$ represented the chance of an individual aged n living precisely x moments of time, then $\int \phi x dx$, taken from $x=0$ to $x=$ the longest possible term of life, would correctly represent the average duration of life in persons aged n years. The tables however are so imperfect that it is not worth while to attempt the accurate application of the preceding formula, or to use more than the roughest of the processes which will be described in QUADRATURES, METHOD OF. The theoretical imperfection of this process consists in its being necessary to suppose that the individuals who die in any one year die at uniform intervals throughout that year; so that, one with another, they enjoy half of their year of death. The mean duration of life is then constructed as follows. Let a be the number living at the age in question, of whom let b, c, d, &c., be left at the end of successive years. Then $a-b$ die in the first year, enjoying among them $\frac{1}{2}(a-b)$ years of life, while b (who survive) enjoy the whole year. Consequently the a persons enjoy, in the first year of the calculation, $b+\frac{1}{2}(a-b)$, or $\frac{1}{2}(a+b)$ years; and similarly it may be proved that they enjoy $\frac{1}{2}(b+c)$, $\frac{1}{2}(c+d)$, &c., in the second, third, &c. years. If these be put together, the result is $\frac{1}{2}a+b+c+d+$, &c., which, divided by a, gives for the average quantity of years enjoyed by each individual,

$$\frac{1}{2}+\frac{b+c+d+\text{\&c.}}{a};$$

or the rule is, add together the numbers left at every age above that given, divide by the number alive at the given age, and add half a year.

If it be judged advisable to make the preceding result a little more mathematically correct, diminish the preceding result by the 12 a-th part of $a-b$. [MORTALITY, LAW OF; DE MOIVRE'S HYPOTHESIS.]

LIFE INSURANCE. The great importance of this subject and the number of new plans either formed or in agitation make it desirable to place this article as late as possible in the order of time of publication. We therefore refer it to REVERSIONS.

LIFE-BOAT. A boat constructed with great strength to resist violent shocks, and at the same time possessing sufficient buoyancy to enable it to float though loaded with men and filled with water, is called a life-boat. Such boats are maintained at most of the ports of this kingdom, always ready to put to sea when vessels are seen in danger of shipwreck, and provided with means for being conveyed to the shore and launched as rapidly as possible. As early as the year 1785, a patent was granted to Mr. Lukin for a life-boat with projecting gunwales and hollow cases or double sides under them, as well as air-tight lockers or enclosures under the thwarts: these contrivances increased the buoyancy of the boat, and the air-tight cases under the gunwales, by their weight when raised above the surface of the sea, and their resistance when depressed beneath, greatly prevented rolling. Mr. Lukin's boat was strong and buoyant, but it was liable to be disabled by having the sides staved in. This defect was obviated in Mr. Greathead's boat, which was invented soon after. This life-boat is usually thirty feet in length, ten in breadth, and three feet three inches deep at midships: both extremities are made precisely of the same form, so that it goes through the water with either end foremost, and its shape lengthwise is a curve, so formed that a line drawn from the top of one stem to that of the other would be two feet and a half above the gunwale at midships. In this boat there are five thwarts, or seats for rowers, doubled-banked, so that it must be manned with ten oars. It is cased and lined with cork, which gives it such buoyancy that it will float and be serviceable though so damaged by hard knocks as to be almost in pieces; and this is an accident which the softness and elasticity of the cork is well calculated to prevent. The cork on the outside is four inches thick, and it reaches the whole length of the shear or side of the boat; on the inside it is thicker, and the whole quantity is about seven hundred-weight. It is firmly secured with slips or plates of copper, and fastened with copper nails. The advantages of this boat are stated to be, that its curvature gives it great facility in turning, a single stroke of the steering oars, of which there is one at each end, moving it as though on a centre;—that the covering of cork, being immediately under the gunwale, gives great liveliness, or disposition to recover its balance after being suddenly canted aside by a heavy wave; and that its capability of going with either end forwards increases its manageability.

The life-boat is usually kept in a boat-house near the shore, and is sometimes placed on a carriage with four little wheels for conveyance to the sea. This mode is however somewhat unmanageable, and the following is found to be more serviceable:—Two wheels, nine feet in diameter, are connected by an arched axle, to which is fixed a long pole of considerable strength to serve as a lever: the wheels are so far apart that the boat can stand between them with the arched axle over its centre. When the pole is in the horizontal position, the arch rises above the boat; but when the pole stands up perpendicularly, then the arch touches the boat. In order to move the boat, the arched axle must be brought over its centre, and the pole set upright: two chains fastened to the arch must then be hooked on to two eyebolts fixed in the inside of the boat: the pole is then lowered, the arch rises, and brings up the boat with it, ready for rapid movement. This plan also gives great facility in launching, which was difficult with the carriage.

Mr. Greathead's boat was first built at Shields in 1789; and before the year 1804, when the Society of Arts voted the inventor their gold medal and 50 guineas, it had saved nearly 300 lives from vessels wrecked near the mouth of Tynemouth haven.

The rules given for the management of this boat are applicable to all of a similar sort. It should be entrusted to an experienced man acquainted with the times and direc-

tion of tides and currents, and he is recommended to keep the boat with her head to the waves as much as possible, giving her an accelerated motion as he nears a wave. Great caution is required on approaching the ship in distress, in consequence of the reflux of the waves, which is often very dangerous; in general it is better to get to a ship on the lee side. The rowers are recommended to exercise themselves in the use of this boat, and to obey strictly the person commanding. The oars are directed to be short, as more manageable in a rough sea, and to be made of the best fir, because ash is found to be too pliant. It is also directed that the body of the boat should be painted white, to catch the eye of those in danger as soon as it rises above the waves.

In the year 1807 Mr. Wilson, of London, produced a life boat, for which he received the gold medal of the Society of Arts, although in fact its principle was nothing more than that of Mr. Lukin's, with the exception that Mr. Wilson divided his hollow outriggers into separate bodies, so that if one of them was beaten in by striking on a rock or by the force of the waves, the rest were still serviceable. This was undoubtedly a great improvement, and Wilson's plan also contained other useful suggestions in building applicable to boats for general purposes, though not essential to the peculiar object of life-boats.

Besides those life-boats which have been constructed for the especial purpose, there have been several inventions for converting ordinary ships' boats into life-boats upon a sudden emergency, which may be applied by the crew of a ship in distress. The Rev. Mr. Bremmer, some time before the year 1800, proposed that empty casks should be strongly fixed in ships' boats upon a plan described by him, which on trial was found to answer perfectly. In that year he tried several experiments in the port of Leith, in the presence of a committee named by the directors of the Trinity House there, who presented him with a piece of plate in token of their approbation. His plans were various; some of them might be put in execution with very little previous preparation, and require only such matters as are contained in almost every ship. In the year 1817 the silver medal of the Society of Arts was voted to Mr. Bray for an invention by which air-tight boxes should be fixed under the thwarts of ships' boats to render them buoyant, but these could not be applied extemporaneously, like some of Mr. Bremmer's plans. The same objection exists to Captain Gordon's life buoy, invented in 1821, though this, not being a fixture to the boat, might be kept on board ship to be applied to any boat when wanted. It consisted of a series of bamboos of different lengths fastened together; the uppermost piece was the longest, the others diminished gradually to the lowest, which was the shortest of all; thus forming a triangle, which was covered with pieces of sound cork, strongly fixed to the bamboo rods. Two of these triangles were intended to be fastened to a boat, one on each side, the long pieces being close to the gunwale, the shortest near the keel.

Lieutenant Ansell, in 1829, proposed that bags should be made of well-tarred sheepskin, closed on all sides except at one leg, which should be furnished with a spigot to retain the air when inflated; these bags might be kept in store to be blown up at a minute's notice, when they would act as large bladders.

The most recent invention of this sort that we have seen is that of Captain Rorie, published in 1837. He proposed pieces of copper tubing, six inches in diameter and six feet long, to be fitted under the seats of ships' boats, to be always ready: he adds that in tropical climates the large trunks of bamboos are readily procured, and these, being strong and naturally divided by joints, would answer even better than copper tubes.

All these plans are serviceable, and there can be no doubt that many lives might be saved if vessels were provided with means for aiding a person in the water. Cork mattresses have been found useful, but it was alleged that they gave sailors facilities to desert, and they were discontinued: floating ropes lined with cork have also been suggested, but, like fire-escapes, these contrivances are never at hand when most wanted.

Boyce's life-buoy, invented in 1813, was different in its object from all those mentioned: it was intended to be kept suspended at a ship's stern, to be dropped into the water in case a man fell overboard. It was composed of two hollow wooden cylinders, either made air-tight or else filled with cork, and connected by a wooden grating, so as to form a sort of raft. This might lie on the water with either side uppermost, and it was therefore furnished with a rudder, and with a mast and sail on both sides. A buoy of this construction was dropped from Monmouth bridge, where the stream was very rapid, and it was found to support a man who swam to it, and to enable him to sail against the stream. If such buoys were to be generally used, some plan might surely be devised to cause them to fall always one way, and so to render the double mast and sail unnecessary.

In 1830 Captain Lillicrap, of the navy, proposed to the Admiralty to convert the warping buoys which abound in our harbours into a sort of life-buoys, by fitting them up with wooden battens placed lengthwise from end to end upon their circumference. It should be understood that these buoys are like large barrels, and the battens are merely wooden shelves or rafters nailed along their sides, with hollows for the hand to lay hold on as on a rail. These were first tried in Portsmouth harbour, and within one month the crew of a small vessel which sank in the harbour was saved by holding to them. Such battens have since been fixed on the buoys in several British ports, and in several instances they have saved many lives.

By these several appliances many persons are saved from death on our coasts, though even Greathead's boat, the best of them all, has not been infallible. A case happened in the year 1810, at Tynemouth harbour, where a life-boat, which had taken several persons on board, was almost destroyed by the waves. It continued to float as long as it remained together, but of course became unmanageable, and being driven among the rocks, it was dashed in pieces. Of twenty-seven persons on board only two were saved.

LIFFY, River. [IRELAND; DUBLIN, County.]

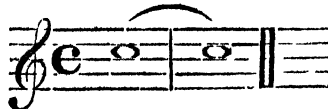
LIFTING, on Easter Monday and Tuesday; a custom which formerly prevailed among all ranks throughout the kingdom, and is yet partially practised in several of our distant counties In Lancashire, at Warrington, Bolton, Manchester, and other places, on Easter Monday, the women, in parties of six or eight each, still continue to surround such of the opposite sex as they may meet, and either with or without their consent lift them three times above their heads into the air, with loud shouts at each elevation. On Easter Tuesday the men in similar parties do the same for the women. The like practice prevails at Shrewsbury, and probably in other places. In Pennant's time it was not uncommon, if it is not still used, in North Wales. Strange as it may seem, this custom is intended to represent, or rather to commemorate, our Saviour's resurrection. The lifting of King Edward I. in his bed, on the morrow of Easter Sunday, by a party of the ladies of the bedchamber and maids of honour, together with the fee paid to them upon the occasion, occurs upon the accompts of the comptroller of the household of the eighteenth year of that king, still preserved among the records in the Tower of London. (Brand's *Popular Antiq.*, vol. i., pp. 154, 155; Pennant's *M.S.*; Brady's *Clavis Calendaria*, 8vo., Lond., 1812, vol. i., p. 274.)

LIGAMENT. [ARTICULATION.]
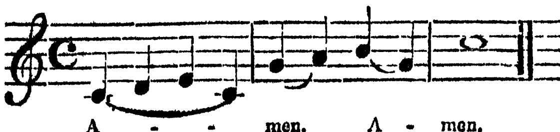
LIGAN. [FLOTSAM.]

LIGATURE. [HÆMORRHAGE.]

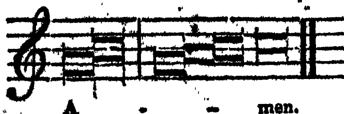
LIGATURE, in modern music, a binding, indicated by a curved line, ⁀. If two notes on the same degree are thus joined, only the first is to be struck, but the second is to continue its full time. *Ex.:*



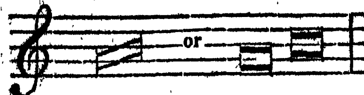
In vocal music all the notes which are set to one syllable are bound together. *Ex.:*



In music in the old character, *i.e.* consisting of longs and breves, the notes in *ligature* were joined—were written or printed side by side. *Ex.:*



And sometimes the two characters were blended into one. *Ex.*



But the antient ligature is now become obsolete, and any further explanation of it is unnecessary.

LIGHT. The laws which govern the phenomena of light, when propagated through a vacuum or a uniform uncrystallised medium, form, with the exception of the laws of reflection, the only branch of optics with which the antients had a scientific acquaintance. The discovery of single and double refraction, of chromatic dispersion, polarization, and of mutual interferences exhibited in the various experiments of diffraction, have formed both to the practical and scientific men of modern times the sources of exploration in the grandest phenomena of the physical world, as well as in those which belong to the most delicate scale.

The first branch of this subject has been called Photometry, and is confined to light emanating from whatever sources, but unmodified in its progress through space by any external influences.

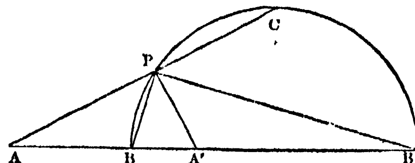
In our cognizance of the form of objects by the sense of feeling, the hand or other part of the body is brought into contact with the object of our perception, and by some antient philosophers it was supposed that in like manner rays of *sight* were emitted from the eye in straight lines, and by their impulse on distant bodies caused our perception of their form and colour. But on examining the structure of the eye [EYE] we find that to whatever luminous object we direct the optic axis, an image of the object is depicted on the retina in connexion with a system of nerves, in the same manner that similar pictures are formed by mechanical contrivances, such as lenses upon screens, &c.; hence it is obvious that vision is caused by light proceeding from the observed object. Now since bodies are perceptible in all positions, it follows that light emanates from luminous bodies in all directions; and as to opaque bodies, the light which falls on the irregularities of their surfaces is in a great measure afterwards scattered in all directions, by which they become visible to any number of observers.

Suppose that a luminous point is enveloped by a spherical surface of a certain radius, but having that point placed at its centre, it will be obviously illuminated all over uniformly with a brightness or intensity depending on the magnitude of the radius. We can ascertain the connection between this brightness and the radius, by supposing the light from the same source diffused over another and concentric spherical surface of a greater or less radius; it will evidently be more or less intensely diffused in the exact proportion in which the one surface is less or greater than the other. Now spherical surfaces are proportional to the square of the radii, therefore the intensity of light proceeding in vacuo from any luminous origin must be in the inverse proportion of the square of the distance from that point. We have employed the term *proceeding* as applicable to light, because that by two independent astronomical phenomena, namely, the aberration of light, and by the retardation of the eclipses of Jupiter's satellites, we are alike taught that light, whether of the sun, planets, satellites, or fixed stars, is not propagated instantaneously throughout space, but travels with a velocity in round numbers of 192,000 miles per second.

A ray of light has its origin at a luminous point, whence it diverges in an infinitely small solid or conoidal angle, and is the geometrical element of the total spherical emanation of that point. These rays proceed in straight lines in vacuo or a uniform medium, for no opaque body can screen the luminous point from view, except when placed in the straight line joining the eye of the observer with the origin of the light, or, which is the same, we cannot see through bent tubes; but the modifications suffered by light at the surfaces of bodies, and in the interior of media, cause generally a deflection, sometimes sudden, at others gradual, in the direction of the ray.

If the intensity of light emanating from a luminous point, that is, the illumination of a unit of spherical surface having a unit radius, be represented by i, and a small plane, of which the area is a, be exposed to the same light at a distance r from the origin, and situated perpendicular to the luminous ray, the quantity of light which it receives will be represented by $\frac{a\,i}{r^2}$; but if the plane, instead of being perpendicular, be inclined to the direction of the ray at an angle α, the total illumination of the plane will then only be $\frac{a\,i}{r^2}$. Sin (α), for a Sin α is the area of the plane projected in a direction perpendicular to the ray, and this projection at the same distance would evidently receive the whole of the light which fell on the inclined plane: we shall give a few examples of these formulæ.

Suppose we seek the point situated between two lights which receives the least illumination from both: represent its distances from the luminous bodies by r, r', and their intensities by i, i', respectively; then if u be the actual illumination, we have $u = \frac{i}{r^2} + \frac{i'}{r'^2}$: now since $r + r' = c$, the constant distance between the lights, therefore $\frac{dr'}{dr} = -1$ and $-\frac{1}{2} \cdot \frac{du}{dr} = \frac{i}{r^3} - \frac{i'}{r'^3}$; $\frac{1}{6} \cdot \frac{d^2u}{dr^2} = \frac{i}{r^4} + \frac{i'}{r'^4}$. The last equation shows that $\frac{d^2u}{dr^2}$ is positive, and therefore corresponds to a minimum; the former, since $\frac{du}{dr} = 0$, gives $\frac{r'^3}{r^3} = \frac{i'}{i}$, which combined with the equation $r + r' = c$ gives $r = \frac{c \cdot i^{\frac{1}{3}}}{i^{\frac{1}{3}} + i'^{\frac{1}{3}}}$, $r' = \frac{c \cdot i'^{\frac{1}{3}}}{i^{\frac{1}{3}} + i'^{\frac{1}{3}}}$. Hence we see that the intensities of two lights are directly as the cubes of their distances from the least illuminated point betwixt them. This result may serve in some cases to compare the intensities of different lights.

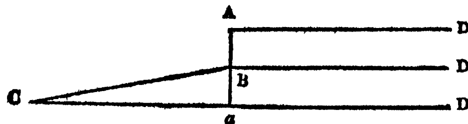


Suppose next that A, A′ represent two lights of the respective intensities i, i', and that PB, PB′ are planes, each of which bisects the angles APA′, CPA′; the angle BPB′ is obviously then a right angle, and the plane PB as well as PB′ will be equally illuminated at the point P by the two lights, provided $\frac{i}{AP^2} = \frac{i'}{A'P^2}$, that is, provided $\frac{AP}{A'P}$ be the constant $\left(\frac{i}{i'}\right)^{\frac{1}{2}}$; then by Euc., book vi., $\frac{AB}{A'B}$ is equal to the same constant, by which the point B may be found, and $\frac{AB'}{A'B'}$ being still the same, B′ is similarly known; hence if on BB′ as diameter a circle be described, each point, such as P, will have the property that planes directed through it to either extremity of the diameter will be equally illuminated by the two lights; but the different portions of the curve itself do not possess this property, which may be too readily supposed from the inaccurate statement of this question in optical treatises.

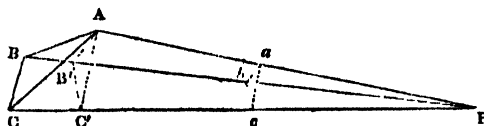
Let it now be proposed to find the nature of a curve, every element of which shall receive equal illuminations from two given lights. Let r, r' be the radii vectores to any point drawn from the two poles or lights, and θ, θ' the angles which r, r' make with the axis or line joining the lights internally; then s representing an arc of the curve, the sines of the angles at which r, r' are inclined to an element of the curve are $r\frac{d\theta}{ds}$ and $-r'\frac{d\theta'}{ds}$; and representing the intensities as before, the condition of equal illumination gives the equation $\frac{i}{r^2} \cdot \frac{rd\theta}{ds} = -\frac{i'}{r'^2} \cdot \frac{r'd\theta'}{ds}$: whence $\frac{d\theta'}{d\theta} = -\frac{i}{i'} \cdot \frac{r'}{r} = -\frac{i}{i'} \cdot \frac{\text{Sin}\,\theta}{\text{Sin}\,\theta'}$, by trigonometry. In-

tegrating we find $i \cos \theta + i' \cos \theta' =$ const. which (together with the common trigonometrical equations) gives the polar equation of the curve sought. We should obtain a negative sign, instead of a positive, if we suppose the curve equally illuminated on opposite sides.

Having now considered the laws of the emanation of light from points, we are next to consider its emanation from luminous surfaces, particularly when the direction of the light is oblique to that of the surface. To this end suppose A B, B C to be two planes of equal luminosity relative



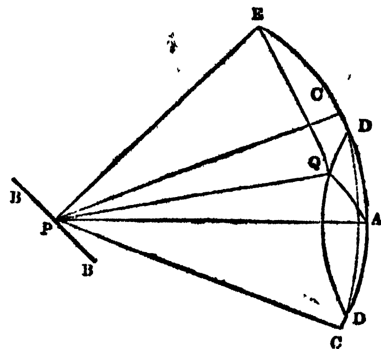
to a unit of either, and regarding only that portion of the light which emanates in the directions A D, B D, C D, perpendicular to A B produce A B to meet C D in the point a, and suppose the extent of B C to be taken, such that B a = B A, then B C will seem to the eye (receiving the rays in the directions A D, B D, C D) to be of the same extent as its projection B a, or as that of B A; but as its luminous surface is greater, it would appear brighter than B A in the ratio of B C to B A or B a, if the intensity of the oblique emanation from C B were equal to that of the direct emanation from B A. Now we know by experience that it has only the same brightness as its projection, for if we take a bar of heated iron into a dark room, it appears no brighter when viewed obliquely than direct, the only observable difference being in apparent size, which is that of the projection of the bar on the line of vision: hence it follows that the emanation from a unit of the oblique surface is less than that of the direct, in the ratio of B a to B C, or, which is the same, as the sine of the angle of emanation B C D is to unity. After emanation it follows the same law as direct light, of diminishing in intensity inversely as the square of the distance. This law has been the subject of much contention, but we may remark that something similar occurs in the action of electrodynamic currents, which though they follow the law of the inverse square at different distances in a given direction, yet in different directions the intensity varies in a trigonometrical function of the directions of the currents acting and acted upon, and the line of junction. The law above mentioned we should not be warranted in applying to luminous gases, as for instance, the flame of a candle, since the light of the different parts freely then permeates the mass.



Let A B C represent a small luminous plane situated obliquely with respect to a point P and A B′ C′, its projection taken perpendicular to P A, and finally $a\,b\,c$, a similar plane to the latter taken at a distance P a = unity, the quantity of light emitted by A B C to the point P is the same as if it proceeded from A B′ C′, and is therefore represented by $i.\ \frac{\text{Area A B}'\text{C}'}{\text{P A}^2} = i.\ \frac{\text{Area } a\,b\,c}{\text{P}\,a^2} = i.$ Area $(a\,b\,c)$, where i represents the intensity of the given luminous plane; hence if we have any luminous surface, we may, by dividing it into very small elements, transfer each element to another situated at a unit of distance from the illuminated point; in other words, we may substitute for this surface that portion of a spherical surface with radius unity which would be cut out by a conical surface having P for vertex and exactly enveloping the luminous surface. The calculation of the illumination of any small plane by a luminous surface of any figure is thus reduced to that arising from a portion of a spherical surface having that plane placed at its centre.

Example. A distant luminous sphere subtends a given angle $2\,a$ at the eye of an observer: to find its total illumination of a small plane area A placed at the eye and inclined at a given angle β to the right line joining the eye and the centre of the luminous sphere.

Let B P B represent the small plane; with centre P and radius unity describe a circular arc C A C, of which the measure is $2\,a$, and which by rotating round its axis P A



generates a spherical surface of equal illuminating power with the given sphere. Let the angle B P A = β.

Take a radius P Q forming an angle A P Q = θ, and which, by revolving round P A, traces the circle D Q D. The plane B P B is taken perpendicular to the plane of the diagram. Let ω be the inclination of P Q to the given plane. The spherical element at Q is $\sin \theta.\ \delta\theta\,\delta\phi$, where ϕ is the inclination of the plane A P Q to that of the diagram, and its illuminating power is therefore $i \sin \omega \sin \theta.\ \delta\theta\,\delta\phi$, therefore the total illumination is expressed by $A \int_\theta\int_\phi i \sin \omega \sin \theta$, the limits of ϕ being 0 and 2π (where π is the semicircumference to a unit radius), and of θ being 0 or a. When the intensity is uniform, we get the illumination $I = A\,i \int_\theta\int_\phi \sin \omega \sin \theta$. Draw P E perpendicular to the plane B B; then in the spherical triangle Q A E we have $QA = \theta$, $\angle QAE = \phi$, $AE = \frac{\pi}{2} - \beta$, and $QE = \frac{\pi}{2} - \omega$; hence by trigonometry

$$\sin \omega = \sin \beta \cos \theta + \cos \beta \sin \theta \cos \phi.$$

$$\text{Hence} \int_\phi \sin \omega \sin \theta = 2\pi \sin \beta \sin \theta \cos \theta \ldots\ldots$$

and now integrating relative to θ, we have $I = A\,i.\ \pi \sin \beta \sin^2 a$, as the illumination required. In this investigation the whole of the light is supposed to fall on the same side of the plane.

If a small hole be formed in the window-shutters of a darkened chamber, the rays of light passing from opposite parts of any luminous object outside cross each other in entering the orifice, since they necessarily proceed in straight lines, and therefore form on the opposite wall of the chamber a perfectly inverted image of the external object, and if the latter be in motion, the image will also move in the contrary direction. If m be the magnitude of the object, and x its distance from the hole, and a the width of the chamber, then the light being supposed to enter directly, the magnitude of the image, by the known laws of similar figures, will be $m.\ \frac{a^2}{x^2}$. Again, if i represent the intensity of the light proceeding from an object at a unit distance, the intensity as it enters the orifice will be $\frac{i}{x^2}$, and this may be taken for its intensity in the image when a, the width of the chamber, is small compared with x, the illumination of the image, for a given quantity of light is inversely proportional to the magnitude of the image, and therefore the brightness of the latter is constant for all distances of the object. The eye is such a chamber, and therefore a luminous object should appear of equal brightness at all distances, but the absorption of light by the atmosphere causes the greater dimness of distant atmospheric objects.

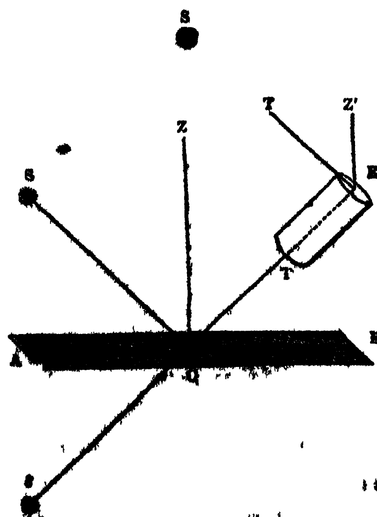
If we suppose the quantity of light absorbed by a transparent medium to be a proportional part of the incident light, then denoting by i the intensity of light which corresponds to a space x traversed, we have on this hypothesis $\frac{d\,i}{d\,x} = -k.\,i$, k being a constant dependent on the particular nature of the medium, and by integration we find $i = I.\,\epsilon^{-kx}$ where I is the initial intensity previous to the light entering the medium, and ϵ the base of Napierian logarithms;

therefore the intensity would diminish in a geometrical progression for equal spaces successively traversed.

From these principles we are enabled to calculate the laws which the direct rays of light obey, from their emanation to their incidence. If the body on which the latter takes place be unpolished and opaque, a portion of the light enters into it for a small depth, and is there partially absorbed; the complementary portion is scattered in all directions; the surface therefore becomes itself, to that extent, a source of light, but the composition of the differently coloured rays [DISPERSION] may be widely different from that of the incident light: for instance, if the incident light were an equal mixture of red and blue rays, and if the surface favoured the absorption of the latter more than of the former, the scattered or complementary light, then containing more of red than blue rays, would proportionally tinge with red the apparent colour of the surface. Solar light is a compound of various homogeneous-coloured rays; and by their unequal absorption or transmission bodies acquire these apparent colours; but the perception of form arises from the modifications of light [DIFFRACTION] on the borders, ridges, and angles of the surfaces; and the painter, when he produces a relief on a plane surface, imitates those modifications in the colours which he applies. Hence the perception of form is lost when this incident light is excluded, as in a heated square bar of iron in a dark room, which when turned round its axis seems always to be a flat surface, growing wide and narrow alternately as its edges or faces are turned to the eye; and even when incident light is admitted, a greatness of distance from the eye renders those modifications inappreciable unless under the most favourable circumstances; and thus the heavenly bodies, instead of appearing as round solids, are projected upon a spherical surface, having the eye for the centre, unless where this surface becomes elongated by the greater dimness of rays which traverse unequal portions of absorbing media. When the body exposed to incident light has even a slight polish, the scattered light will then be most copious in the directions in which the *regular reflections* take place. Such portions of the surface as are situated, relatively to the eye, proper for regular reflections of the incident light, have therefore a much greater apparent brightness than the parts adjacent, and thus assist in producing the ideas of the position and form of the parts.

When the polish of the surface is such that the irregularly scattered rays bear but a small proportion to the regularly reflected light, we become then principally sensible of the effects of the latter in producing *images* of all the bodies of which the incident light is reflected to the eye: we are thus led to consider the laws of regular reflection.

Let A B represent a surface of mercury at rest, and therefore perfectly horizontal; E T the axis or line of collimation of a telescope, by which we perceive *s* the image by reflection of the star S, and let the angle A C *s* of its apparent depression below the horizon be measured. Then turning



the telescope in the vertical plane Z C E until its line of collimation takes a position T' E, in which the star itself becomes visible; and measuring its apparent zenith distance T' E Z' or T C Z, this angle is found invariably to be the complement of the former angle A C *s*. Now Z C T being the complement of A C *s* or T C B, it follows that the angles Z C S, Z C T are equal.

This experiment demonstrates that the reflected ray C T is in the same plane Z C S as the incident ray C S and the normal C Z, and that the angle formed by the reflected ray C T and the perpendicular to the surface, that is, T C Z, or the *angle of reflection*, is equal to S C Z, the *angle of incidence*. Such are the laws which govern the reflection of light.

Let us suppose that light consists of a succession of particles emitted from the luminous body at intervals sufficiently short to produce vision, which hypothesis is generally known as that of *emission*; then the preceding law would result from the supposition that the luminous molecules, on approaching and entering the reflecting medium, are subject to forces proceeding from this medium, and of which the resultant is normal to the surface. For conceive the velocity of the luminous particle as it enters the medium, or rather, as soon as it comes within the influence of its forces, to be decomposed into one parallel and one normal to it. The force of the medium can exercise no influence on the former, and it is therefore the same at the exit of the ray from the influence of the medium as at its entrance. Again, the effect of the normal force on the square of the normal velocity in a space small enough to consider the force uniform, is the product of half this force and the small interval of space, and it is therefore the same in increasing this quantity for the returning, as in diminishing it for the incident ray; and therefore the normal velocities of the incident and reflected rays are equal, as well as the parallel; from whence it necessarily follows that the angles of incidence and reflection are equal. It admits of easy geometric demonstration that the path of the ray between any fixed points in the incident and reflected parts is a minimum (neglecting the insensible curvilinear part), in reference to any other supposed positions of these rays, when the reflecting surface is plane, or any curved surface which is tangent externally at the point of incidence to a spheroid having the fixed points for foci, and the length of the ray between them as axis major; for those touching the spheroid internally it is a maximum.

If we suppose that light is propagated by undulations in a rare elastic medium from the luminous point as an origin, the velocity of the waves, after reflection, is the same as before incidence, since the medium is the same; and hence, as in sound, the angle of reflection would still be the same as that of incidence. [ECHO.] Thus both the hypotheses of emission and of undulations satisfactorily account for this fundamental law.

If the reflected ray of light were transformed to an incident, reciprocally the path of the incident would become that of the reflected. The same is true for any number of reflections at different surfaces.

The *deviation* of a ray of light, after it has undergone any alteration in its course by the action of media, is the inclination of the primitive and final directions of the ray taken in the sense in which they are moving. This deviation by one reflection on any surface is the supplement of double the incidence, or is the double of the inclination of either ray to the medium.

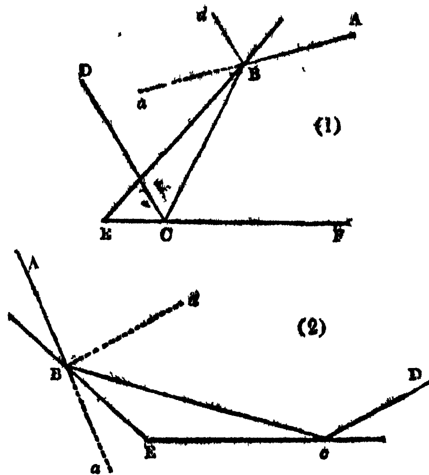
A *plane of reflection* contains a successive incident and reflected ray, and is necessarily perpendicular to the corresponding reflecting surface.

When there are successive reflections, the inclination of the plane of the first to that of the last reflection is the *deviation in plane*, the last ray being then in a different plane from the first, the first kind of deviation or that of direction is the angle between the first ray produced beyond the incident point (which is the course the ray would have pursued if unreflected), and a parallel to the last ray drawn from the same incident point.

When light is reflected by two parallel planes there will be neither deviation in plane nor in direction; more generally there will be no deviation in plane when the first incident ray is in a plane perpendicular to the intersection of the two reflecting planes.

In the latter case, where both reflections take place in the same plane, let us consider the amount of the deviation in direction.

Let A B C D represent the course of the ray reflected at B and C by the reflecting planes E B, E C. Let B *a* be the first ray produced, and B *d* the parallel to the final ray; then



the angle aBd is the deviation. When the other two rays are at opposite sides of the intermediate ray BC (*fig.* 1), then the deviation of CD from AB is the *difference* of the two deviations at B and C, or twice the angle BCF − twice the angle CBE, that is, $2\angle$E, or double the inclination of the mirrors. But when AB, CD are at the same side of BC, the total deviation is the *sum* of the deviations at B and C, or twice the angle EBC + twice the angle ECB, which is the same as $360^\circ - 2\angle$E. This is a re-entrant angle when E is acute, and therefore we may then substitute for it the corresponding natural angle $2\angle$E. Hence the deviation is double the inclination of the mirrors when acute, and double its supplement when obtuse. This property is turned to excellent use in Hadley's sextant. In general, when there are any number of reflections in one plane, the total deviation is the sum of the deviations at each reflection, giving negative signs to those where the rays are turned in a contrary way to the first reflection; this sum is independent of the first angle of incidence when the number of planes is even.

With the exception of this case the ray will deviate not only in direction but in plane, and as the determination of these deviations is important from their connection with the subject of polarized light, we shall therefore trace the reflected rays by analytical geometry.

Take the origin of co-ordinates at the first point of incidence, and make the first mirror the plane of xy, and the plane of the first reflection that of xz, referred to which the equation of the second mirror may be represented by $Ax + By + Cz = 1$, and let a be the first angle of incidence. Then the equations to the first incident ray are $x + z \tan. a = 0$, $y = 0$, and to the intermediate or first reflected ray $x - z \tan. a = 0$, $y = 0$. Hence we easily find the co-ordinates of the second point of incidence a, b, c, to be thus expressed: $a = p \sin a$, $b = 0$, $c = p \cos a$ where p is the reciprocal of $A \sin a + C \cos a$.

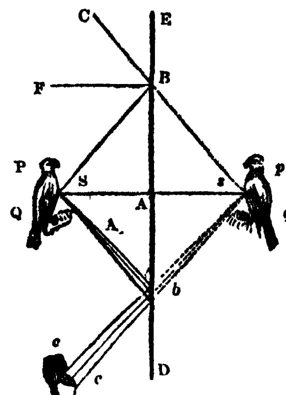
The equations to the normal of the second mirror are $C(x-a) = A(z-c)$, $Cy = B(z-c)$; the plane which passes through this normal and the intermediate ray to that of the second reflexion, and is defined by the equation $B(x \cos a - z \sin a) = (A \cos a - C \sin a)\, y = -q.y$ for abridgement. The inclication ϕ of this plane to that of xz is the deviation in plane, and we readily find $q \tan \phi = B$, by which that deviation is known.

Suppose the equations to the final reflective ray are $x - a = m(z-c)$, $y = n(z-c)$, and substitute in the equation to the second reflecting plane, we find $B(m \cos a - \sin a) = -nq$. The cosine of the second angle of reflection is $\dfrac{C + mA + nB}{\sqrt{(A^2+B^2+C^2)(1+m^2+n^2)}}$; and of the second angle of incidence $= \dfrac{A \sin a + C \cos a}{\sqrt{A^2 + B^2 + C^2}}$; whence $p^2(mA + nB + C)^2 = 1 + m^2 + n^2$; we have thus two equations to determine m and n. These equations are also true for the second incident ray, and therefore if we eliminate m, the quadratic resulting must have one root $n = 0$, whence the other root is known from a simple equation, and the cosine of the deviation is $\dfrac{1 - m \tan (a)}{\sqrt{(1 + m^2 + n^2) \sec^2 (a)}} = \dfrac{\cos a - m \sin a}{p(mA + nB + C)}$.

When the deviation in plane is a right angle, it is required to find the deviation in direction and the second angle of incidence.

Since generally $\tan \phi = \frac{B}{q}$ and ϕ is a right angle, therefore $q = 0$, which gives the two relations $A = C \tan a$, $m = \tan (a)$. Let a' be the second angle of incidence, we have $\cos a' = \dfrac{C}{\sqrt{(C^2 + B^2 \cos^2 a)}}$; or $\cos 2a' = \dfrac{C^2 - B^2 \cos^2 a}{C^2 + B^2 \cos^2 a}$; we also find $n = \dfrac{2BC}{C^2 - B^2 \cos^2 a}$; and if D be the required deviation, we have in this case $\cos D = \dfrac{C \cos 2a}{C + nB \cos^2 a} = \cos 2a \,.\, \cos 2a'$. Moreover if I be the inclination of the two mirrors $\cos I = \dfrac{C}{\sqrt{A^2 + B^2 + C^2}} = \dfrac{C \cos a}{\sqrt{(C^2 + B^2 \cos^2 a)}} = \cos a \,.\, \cos a'$; and in general if a, a', ϕ, are given, cos (I) is very easily found.

When light diverging from any luminous point falls on a plane reflecting surface, it will after reflection diverge accurately from a point similarly situate at the opposite side of the mirror. Let S be the luminous point, DE the mirror, draw SA



perpendicular to the mirror, and produce it until $As = AS$; let SB be an incident ray, join sB, and produce it to C, then it is evident that $\angle$ SBA $= \angle$ sBA $= \angle$ CBE. Now BC, being in the normal plane SAB, and making, with the normal BF, an angle CBF equal to the angle SBF of incidence, must therefore be the reflected ray. The position of s being independent of that of B, the point of incidence, it follows that every other reflected ray bc will diverge from the same point. Thus the reflected light will appear to an eye c as if proceeding from a point s behind the mirror similarly situated with S.

Hence if any *body* PQ be placed before a mirror DE, the light which emanates from P will *appear* after reflection to proceed from the similarly situated point p behind the mirror, and thus an *image* pq exactly similar to the body PQ will be seen by looking at the mirror; the common looking-glass is a familiar example.

If we seek generally the nature of a surface by which light converging to or diverging from one given point may after reflection diverge from or converge to another, it will be simplest to seek first the plane curve possessing the same property, then the surface generated by the revolution of this curve round an axis passing through the two given points will evidently be of the nature required.

Let r, r' be the radii vectores drawn from a point of the curve to the given points, one will correspond to an incident, the other to a reflected ray; and let s be an arc of the curve measured from a fixed point to that of incidence, then $\pm \frac{dr}{ds}$ is the sine of the angle of incidence, using the upper or lower sine according as r increases or diminishes with s; hence we must have $\frac{dr}{ds} \pm \frac{dr'}{ds} = 0$, whence $r \pm r' =$ const. Taking the upper sign we have an ellipse, or with the lower an hyperbola, of which the two fixed points are the foci; hence the prolate spheroid and hyperboloid are the surfaces sought. But if the incident light fall on parallel rays, and is reflected to one point, take the axis of x through this

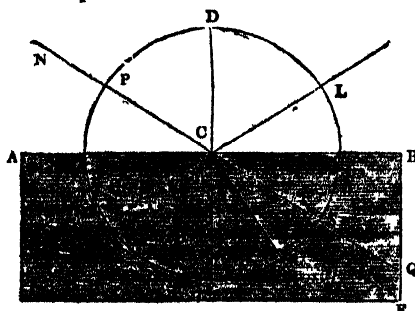
point in the direction of the rays, the sine of incidence is then $\pm\frac{dx}{ds}$, whence $\frac{dr'}{ds}\pm\frac{dx}{ds}=0$, $r'\pm x=$ const., which is the equation to a parabola having the given point for focus; therefore the paraboloid of revolution is the required surface.

But when light diverging from a point falls on a surface, after reflection it generally does not again converge to a point, or diverge from one accurately, but each infinitesimal pencil after reflection converging to or diverging from a point, the locus of all such points forms an illuminated surface called a caustic by reflection, or catacaustic: their equations and properties are rather objects of analytical exercise than of any practical use. [OPTICS.] The caustic is a luminous space when the incident light proceeds from a surface. [CAUSTIC.]

In the case of reflection, the light is returned to the medium in which it moved previous to incidence; but when incident on a transparent medium of greater density than that of the medium in which it originally moved, a portion of the light is reflected, but another portion enters the medium, and then proceeds generally in one straight course in the plane of incidence, but not in the original direction, having a deviation *in course*, though not *in plane*, and sometimes, as in certain crystallized media, it splits into two rays, one in the plane of incidence as before, the other in a plane determined by the nature of the crystal. The same phenomena take place when light passes from a dense to a rarer medium, except that in this case the whole of the light may under a certain incidence be totally reflected.

This alteration of the path of light passing from one medium to another, which is familiarly observed in the apparently bent form of a straight stick partially immersed in water in an oblique direction, is called refraction; that portion which is in the plane of incidence is called the *ordinary ray*, and the other portion, which occurs in the double refraction of uni-axal crystals, is called the *extraordinary ray*. We shall first attend to the laws of single refraction.

Let NPC represent a solar beam in vacuo, and in-



cident at C on a transparent medium (as water), to the surface of which DCE is normal. When the medium is fluid, place a graduated circle DSE in the plane of incidence with its centre at C; a portion of the light will be reflected in the direction CL, and another entering the medium will be refracted in the direction CR. If uninfluenced by the medium, its direction would have been CS. The angle RCE is the angle of refraction, DCN or ECS of incidence, and SCR of deviation. The arcs DP, DL, are equal by the law of reflection, and if we compare the arcs DP, ER, their sines will be found in a constant ratio, depending on the nature of the medium, but independent of the angle of incidence. Thus if I be the angle of incidence, and R that of refraction, the two are connected by the simple relation sin I = μ sin R. The constant μ peculiar to the medium is called its *index of refraction*. When the medium is solid, we can easily compare the tangents of the angles, and thence their sines. The above law will be found rigorously exact.

This law may be accounted for on the theory of emission. Let V be the velocity of the ray before incidence, which is decomposable into a horizontal velocity, V sin I, and a normal one, V cos I. The former will not be affected by the medium; the square of the latter will be increased at the confines of the medium by a quantity n^2, which is the sum of the products of half the force into the element of the normal throughout that inappreciable space in which the forces of the medium do not destroy each other in consequence of proximity to the surface. Therefore the normal velocity of the refracted ray is $\surd\{V^2 \text{Cos}^2 I + n^2\}$ and its actual velocity $\surd\{V^2+n^2\}$; so that the horizontal velocity in the medium is $\surd(V^2+n^2)$ Sin R, which being equated with V Sin I, its value before incidence gives

Sin I' = μ, Sin R, where $\mu = \frac{\surd(V^2+n^2)}{V}$

How are we to account for the reflected ray CL? Why is not the whole incident light refracted? Even when the incident light is perpendicular to the refracting surface, a portion of the light is reflected; and when the ray has but a very small inclination to the surface, a portion will yet be intromitted. Hence we may consider generally that the incident light consists of portions differently disposed to be subject to the repulsive and attractive forces of the medium, or, in Newton's language, are in *fits of easy reflexion or transmission*. When the angle of incidence increases, the normal velocity of the ray diminishes, the effect of the repulsive forces is therefore augmented, or the reflexion is more copious.

If r, r' be any portions of the incident and refracted rays measured to fixed points in their directions, and V, V' the corresponding velocities, and we make ACB the axis of x, we have Sin I' = $\frac{dr}{dx}$, Sin R = $-\frac{dr'}{dx}$, and since

V Sin I = V' Sin R, therefore $\frac{d}{dx}(Vr + V'r') = 0$; and

$Vr + V'r' =$ minimum, which result is agreeable to the dynamical principle of least action.

On the undulatory theory $\frac{r}{V}+\frac{r'}{V'}$ is the time in which the wave traverses those spaces, and this interval must be the same for the various points of the internal wave, therefore $\frac{d}{dx}\left(\frac{r}{V}+\frac{r'}{V'}\right)=0$, or $\frac{\text{Sin I}}{V}=\frac{\text{Sin R}}{V'}$. The ratio of Sin I to Sin R is still constant, but is the inverse of that obtained by the theory of emission. Hence there is a capital distinction between the two theories, for the velocity of light passing from a rarer to a denser medium must be increased by the doctrine of emission, and diminished by the wave theory.

The fact that the differently coloured rays have different refractive indices offers a great difficulty to the latter theory, inasmuch as their internal velocities must be different, which is contrary to the laws of elastic fluids. The circumstances are however different, as the fluid in this case envelops the material particles of the medium, and its waves may be influenced by these disturbances.

If μ be the index of refraction when light passes from vacuum to a medium (A'), and μ' when it passes from vacuum to a medium (A), then $\frac{\mu'}{\mu}$ is the index when the ray is transmitted directly from the former to the latter.

For if we look at a star through a medium bounded by parallel planes, as a plate of glass, its position will not be affected, and therefore the emergent light is parallel to the incident; but since the second angle of incidence is equal to the first angle of refraction by the parallelism of the planes, and the second angle of refraction is equal to the first of incidence by the parallelism of the rays, therefore the index of refraction out of a medium into vacuum is the reciprocal of that from vacuum into the medium. Again, if we place together two plates of different refracting media A, A', the emergent light is still parallel to the incident. Now the second angle of incidence or first of refraction is given by the equation Sin I' = $\frac{1}{\mu}$. Sin I; and the second angle of refraction or third of incidence, by the equation Sin I' = μ' Sin R': whence Sin I' = $\frac{\mu'}{\mu}$ Sin R'. Hence, generally, if the emergent ray be supposed to become incident, the latter would take the place of the emergent.

This fact shows that the velocity of light which traverses several media is the same as if transmitted directly from vacuum to the last medium, which is consonant to both the theories of light. In the wave theory, the velocity of the waves in a medium are independent of the mode of their

propagation, and in that of emission the increment of the square of the velocity generated at one surface of a medium is destroyed by like forces on its emergence at the second, the only increment it finally receives is that generated by the surface of the last medium it enters, and which it would receive if it entered this medium directly from vacuum.

The index of refraction is greater than unity from a rarer to a denser medium, and less than unity from a denser to a rarer. Hence in the latter case there is a limit to the angle of incidence, beyond which it is impossible for the ray to emerge into the rarer medium, for since $\text{Sin R} = \frac{1}{\mu} \text{Sin I}$, it follows that R is a right angle when $\text{Sin I} = \mu$, or the emergent ray is then parallel to the surface; but if $\text{Sin I} > \mu$, then $\text{Sin R} > 1$, which being impossible, it follows that the light must then be totally reflected.

Let us now trace the progress of a ray passing through a medium terminated by planes inclined at a given angle α, as in the case of light refracted by a glass prism. Let μ, μ' be the indices of refraction into the medium through its first bounding plane, and out of it through the second, and let I, R, be the first angles of incidence and refraction, I′, R′, the second, and D the total deviation, and suppose the plane of incidence to be perpendicular to both planes, so that there may be no deviation in planes; the following equations fully describe the progress of the ray: $\text{Sin I} = \mu \text{ Sin R}$; $\text{Sin I}' = \mu' \text{ Sin R}'$; $\alpha = \text{R} + \text{I}'$; $\text{D} = \text{R}' + \text{I} - \alpha$: thus I being given, the first equation determines R, the third I′, the second R′, the fourth D.

When the deviation is a minimum we have $\frac{d\text{R}'}{d\text{I}} = -1$, and generally $-\frac{d\text{I}'}{d\text{I}} = \frac{d\text{R}}{d\text{I}}$; and by differentiating the other equations we have

$$\text{Cos I} = \mu \text{ Cos R} . \frac{d\text{R}}{d\text{I}}; \ \text{Cos I}' . \frac{d\text{R}}{d\text{I}} = \mu' \text{ Cos R}';$$

$$\text{therefore cos I cos I}' = \mu \mu' \text{ cos R cos R}'$$

by squaring $(1 - \sin^2 \text{I}) (1 - \mu^2 \sin^2 \text{R}') = \mu^2 (\mu'^2 - \sin^2 \text{I}) (1 - \sin^2 \text{R})$;

$$\text{or if } m = \frac{1}{\mu'}, \text{ then } (m^2 - 1) \text{ Cos}^2 \text{ I} = (\mu^2 - 1) \text{ Cos}^2 \text{ R}'$$

$$\text{and} \left(1 - \frac{1}{m^2}\right) \text{Cos}^2 \text{ R} = \left(1 - \frac{1}{\mu^2}\right) \text{Cos}^2 \text{ I}'.$$

When the ray after the second refraction moves in the same medium as before the first incidence, we find the minimum deviation when $\text{I} = \text{R}'$ and $\text{R} = \text{I}'$; the internal part of the ray is then equally inclined to both planes. We have then $\text{R} = \frac{\alpha}{2}$ $\mu = \frac{\text{Sin I}}{\text{Sin}\left(\frac{\alpha}{2}\right)}$ which affords a simple method of determining the index of refraction of media capable of being formed into prisms.

By a process similar to that employed already for reflected rays, it is easy to find both the deviations in plane and in direction, when the place of incidence is no longer perpendicular to the refracting surfaces.

When light emanating from one point is refracted accurately to another, if r, r' represent the incident and refracted rays, and s an arc of the curve by the revolution of which the refracting surface is generated, $\frac{dr}{ds}$, $\frac{dr'}{ds}$ are the sines of the angles of incidence and refraction (abstracting from their algebraical signs), therefore $\frac{dr}{ds} \pm \mu \frac{dr'}{ds} = 0$ and $r \pm \mu r' = \text{const.}$: this equation belongs generally to a curve of the fourth order, but if r be infinite, or the incident light parallel to the axis, it gives a conic section, and if the arbitrary constant vanishes the equation $r = \mu r'$ represents a circle. If one surface be given, it is easy to find a second by which homogeneous light may be refracted accurately to a given point.

When light is incident on the generality of crystallized bodies, the ray is refracted in two directions, one of which in uni-axal crystals obeys the ordinary law of refraction, but neither in bi-axal crystals. On the theory of emission the forces cannot here be simply normal to the faces of the crystals, but have a connexion with the directions of the axes of crystallization, while on that of undulation the density of the fluid of light within such bodies is different in different directions, and the form of the wave-surface ceases to be spherical. The further consideration of that subject will be resumed in the article POLARIZATION.

The formation of foci and images by reflection and refraction follows from the simple laws here discussed, for an account of which the reader may refer to OPTICS. The description of the instruments constructed to take advantage of the properties of light being given in LENS; MICROSCOPE; MIRROR; OPTICS, PRACTICAL; TELESCOPE.

The phenomena of diffracted and of polarized light afford more refined criteria of the probabilities of the contending theories of light than the ordinary laws noticed in this article; however, if the dispersion of light offers some difficulty to the doctrine of undulations, we have an obstacle to the theory of emission in the *uniform* velocity of light from the heavenly bodies, though differing in colour and probably in constitution. This ground of improbability is strengthened by observing that on the same theory the different refractive indices belonging to different media show that the molecular powers acting at or near their surfaces *generate* different instead of *uniform* velocities of the intromitted light. The proportion by which the velocity of light from any fixed star possessing aberration may be calculated is the following:—

Vel. of earth in orbit : Vel. of light :: Sin aberration : Sin earth's way.

By the last term is meant the angle which a right line drawn from the earth to the star forms with the direction in which the earth is then moving; in the planetary bodies we must use the *relative* velocity of the earth. [ABERRATION.]

The production of *colours* by ordinary refraction is considered in the articles DISPERSION and RAINBOW; for that produced by light passing near the edges of bodies, the reader may consult DIFFRACTION.

LIGHT, BAROMETRICAL. Many barometers, when the mercury is shaken in the dark, exhibit a luminous appearance in the vacuum over the mercury; the light being sometimes apparently uniform throughout the vacuum, sometimes appearing almost entirely on the surface of the mercury. This appearance was first noticed by Picard, and afterwards by Cassini, Lahire, &c. Though it appears to be an electrical phenomenon, we are not aware that any satisfactory explanation has been given of it, and particularly of the reason why it appears in some barometers and not in others, and why the same barometer sometimes loses the property, and afterwards recovers it.

For a full account of the discovery, and of early hypotheses respecting it, see the first volume of De Luc's 'Recherches sur les Modifications de l'Atmosphère.'

LIGHT-EQUATION. In consequence of the time employed by light to traverse the solar system, phenomena are not seen at the exact moment of their happening. The first step in astronomical prediction is the finding the absolute moment of time at which a phenomenon occurs; the next is to apply a correction which gives the time at which it is seen at the place for which the prediction is made. This correction or equation is called the light-equation. This term is however principally applied to the correction which is necessary in the case of eclipses of Jupiter's satellites.

LIGHT, CHEMICAL AGENCY OF. There are several cases in which light exerts direct chemical agency without its being referrible to the heat which usually accompanies it when intense. Thus, if a mixture of equal volumes of chlorine and hydrogen gases be kept in the dark, no combination takes place between them; but in the light of day they unite slowly, and form hydrochloric acid gas; while, if exposed to the direct solar rays, the combination occurs instantaneously, and with loud explosion.

In the same way, chlorine gas and oxide of carbon, when mixed, unite by the direct action of the sun's rays; but this effect is not produced by the agency of heat, although the taper or the electric spark is capable of causing chlorine and hydrogen to combine.

These are instances of the power of light and the sun's rays in effecting chemical combination, but there are cases in which it possesses the opposite power of causing chemical decomposition.

Thus, if colourless nitric acid be exposed to the sun's

rays, it becomes yellow, and afterwards red, and a quantity of oxygen is liberated by the partial decomposition effected by the solar rays. This gas may be received in glasses properly arranged for the purpose. So also when an aqueous solution of chlorine is exposed to solar light, the water is decomposed, the chlorine unites with its hydrogen to form hydrochloric acid, and oxygen gas is evolved. If also a piece of paper be dipped in a solution of nitrate of silver, and it be kept in the dark, little alteration ensues; but if the paper be exposed to the light, it becomes black, on account of the decomposition of the oxide of silver, and deposition of metallic silver on the paper.

The action of light on the chloride of silver is very remarkable, and it occurs very quickly. This substance, as long as it is kept from the light, even though it be exposed to heat, remains perfectly colourless; but the sun's rays, and even diffused daylight, by their peculiar action blacken it speedily. This effect is most strongly produced by what are called the chemical rays of the spectrum, which impart neither light nor heat; their greatest power is exerted beyond the violet portion of the prismatic spectrum, and the property gradually diminishes in approaching the green rays, and beyond this it is totally wanting. It appears therefore that the chemical rays are more refrangible than the violet, in consequence of which they are partly diffused throughout the blue, indigo, and violet rays.

LIGHTFOOT, JOHN, born 1602, died 1675, one of those English divines who belong peculiarly to the class called *commentators*, that is, who have written notes or comments on the Holy Scriptures. By the mass of readers these persons are not properly distinguished from each other; yet each has his own peculiarity: that of Dr. Lightfoot being an intimate acquaintance with Rabbinical literature. In this perhaps no English scholar has ever equalled him, and he has applied this species of knowledge extensively, and in many instances successfully, to the illustration of the sacred writings. His works are collected in two large folio volumes, with an account of his life prefixed, to which we refer the reader for particular details. He was the son of a clergyman at Uttoxeter in Staffordshire, studied at Cambridge for the church, was ordained, and settled early in life on the living of Stone in his native county. But the temptation of an easy access to books brought him to London; and taking a house at Hornsey, he there spent twelve years in close theological study. There it was that he laid the foundation of his own fame, and of a usefulness which reaches, we see, into a period far beyond the date of his own existence.

In the disturbed times he took part with the Presbyterians, became a member of the assembly of divines, accepted the living of St. Bartholomew beside the Exchange, and was made master of Catherine Hall by the parliamentary visitors of the university of Cambridge. He had also the living of Great Munden in Hertfordshire, which was presented to him in 1644. On the Restoration of King Charles II., when the Church of England was resettled in an episcopal form and order, Dr. Lightfoot complied with the terms of the Act of Uniformity. From that time he chiefly resided on his living at Great Munden, where he had a people who could not estimate his learning and value, but to whom he was very strongly attached. He used, when absent, to say, that he longed to be among his 'russet coats' at Munden.

LIGHT-HOUSES are buildings erected along the seashore, or upon rocks, from which lights are exhibited at night for the direction of mariners. Floating lights perform a similar office, being shown from the masts of vessels moored in certain positions, generally as beacons to enable ships to avoid shoals or sunken rocks in the æstuaries of great rivers.

It is probably from the desire of preserving property, rather than from the wish to provide for personal safety, that the systematic establishment of light-houses has sprung; and it is the practice, in this country at least, to collect the funds required for keeping up our light-houses from vessels, by a rate of charge proportioned to the size of the ship, as the best general test of the amount of property to be secured. The most celebrated light-house of ancient times was that erected about B.C. 283, in the reign of Ptolemy Philadelphus, on the island of Pharos opposite to Alexandria. [ALEXANDRIA.] It is from this building, or rather from the island on which it stood, that light-houses have in many countries received their generic name of Pharos. The most celebrated light-houses of modern times are that on Bell-rock opposite to the Frith of Tay, and that on the Eddystone rocks opposite to Plymouth sound. [BELL-ROCK; EDDYSTONE.]

The erection of light-houses in this country has not proceeded upon any systematic plan, but in every instance they have been constructed simply because of the disastrous losses that had occurred for want of them. From this cause it arises that our light-house establishments in the several parts of the United Kingdom are conducted under entirely different systems, different as regards the constitution of the management, the rates or amount of the light-dues, and the principle on which they are levied. In England there are now 44 light-houses and 13 floating lights, which are considered as general lights, besides 46 light-houses and 4 floating lights, which are local or harbour lights; altogether 107 lights. Of the general lights 30 (?) light-houses and the whole of the floating lights, 13 in number, are under the management of the Corporation of the Trinity House of Deptford Strond; 3 are in private hands under leases granted by the Trinity-House Board; 7 are in private hands under leases granted by the crown, and the remaining 4 are held by individuals under patents or by authority of acts of parliament. In Scotland there are 25 light-houses under the management of a Board entitled the Commissioners for Northern Lights, incorporated by the act 38 Geo. III., c. 58, and consisting of 25 commissioners, who hold the office by virtue of various other public situations held by them. There are besides in Scotland 18 local or harbour lights. In Ireland there are 24 light-houses and 3 floating lights, which are all general lights, besides 9 harbour light-houses under the corporation for preserving and improving the port of Dublin, and 5 other harbour light-houses maintained by various local authorities: making altogether 92 light-houses and 16 floating lights, which are general lights, and 76 light-houses and 4 floating lights, which are local or harbour lights; being in the whole 168 light-houses and 20 floating lights constantly maintained on the coasts and at the entrances of the harbours of these kingdoms.

The following statement contains the amount of light-dues collected for the general lights, the charges of collection, the expense of maintaining the different light-houses and floating lights, and the net surplus receipt in the year 1832, as contained in the Report of the Select Committee of the House of Commons upon the state and management of light-houses, presented in August, 1834:—

By whom held.	Gross sum collected.	Charges of collection.	Expense of maintenance.	Surplus.
	£	£	£	£
By Trinity House, London . . .	83,041	6,670	35,904	40,467
By private individuals	79,676	10,244	9,109	60,323
By Commissioners of Northern Lights, Scotland . . .	35,526	3,261	11,314	20,951
By Commissioners of Ballast-Board, Ireland	42,061	1,960	18,505	21,596
Total . . .	240,304	22,135	74,832	143,337

A principal object in the establishment of these buildings is to give intimation to vessels approaching the coast during the night as to the place in which they are. It is therefore of importance that the lights exhibited on the same line of coast should have some essential differences, so as to be readily distinguished by mariners. The different appearances thus required are given by having two lights placed either vertically or horizontally with respect to each other, or three lights, as at the Casket rocks, or by causing the lights to revolve or to appear only at certain intervals, and to remain in sight only for a given number of seconds at each appearance; or by the employment of lamps of different colours, as in some of the harbour-lights, which do not require to be seen at a great distance.

The mode of lighting now generally used in this country is that of placing an argand burner in the focus of a parabolic reflector. This instrument is made of silver strengthened with copper, and is about 3 or 4 inches in focal length and 21 inches in diameter. The number and the arrangement of reflectors in each light-house depend upon the light being fixed or revolving, and upon other circumstances connected with the situation and importance of the light-house. The mode in use in the light-houses of France consists in

placing a large argand lamp, having four concentric wicks, and giving a very powerful light, in the centre of the upper part of the building, and placing around the lamp a series of glass lenses of a peculiar construction; thus using a refracting instead of a reflecting instrument to collect the light, and only one lamp instead of a greater number. The lens employed is about 30 inches square, plano-convex, and formed of separate rings or zones, whose common surfaces preserve nearly the same curvature as if they constituted portions of one complete lens, the interior and useless part of the glass being removed. To form a lens of such magnitude out of one piece of glass would be hardly possible, and if it were possible, the necessary thickness of the glass would greatly obstruct the light: the merit of the invention consists in building it of separate rings. The light thus obtained is found by experiment to be equal to that afforded by nine common reflectors; and it is calculated that by a consumption of oil equal to that of 17 common argand lamps with reflectors an effect is produced equal to that of 30 lamps and reflectors. There is this further advantage in the French over the English apparatus, that in the English light-house of equal illuminating power with the French there would be daily employment in trimming 30 lamps, and cleaning an equal number of reflectors, which, having a very delicate silver surface, require much care and attention; while in the French light-house there is only one lamp to trim, and the lenses, being of glass, require little or no labour to keep them bright. On the other hand these dioptric lights have not the wide dispersive range which is so necessary in *fixed* lights.

On the northern and western coasts of France there are 89 excellent lights; and the Dutch have 20 lights on their sea-coast and in the Zuyder Zee. The Admiralty have lately published official lists of all these lights.

The rates of light-duty charged to vessels passing within certain limits vary considerably in respect of different lights: for some of those which are under the management of the Trinity House as little as a farthing per ton is charged on British, and a halfpenny per ton on a foreign vessel; while for other lights the rates are as high as a penny and twopence per ton on English and foreign ships respectively. The ships belonging to countries with which we have treaties of reciprocity are entitled to admission to our ports on the same terms as English vessels, and accordingly pay no higher rate of light-duties. The Trinity House has relinquished, in these cases, the right to any increased charge; but in the case of those light houses which are held by private individuals, the difference is made good to those parties out of the customs' revenue. The sum paid on this account in 1832, the latest year of which we have the record, was 35,182*l*.

Light-dues are collected not only upon ships frequenting our ports for the purposes of commerce, but upon such as are driven in by stress of weather, or if they come within sight of our light-houses in the prosecution of their voyages from one foreign port to another, regulations which have occasioned much dissatisfaction, and which are perhaps justly chargeable with exaction.

LIGHTNING. The general circumstances attendant on a thunder-storm are familiar to most persons. It will however be useful to state some of the most prominent, with a view to their explanation when regarded as electrical phenomena.

At first we see light clouds forming with jagged edges, the relative motions of which are frequently opposite and variable. The atmosphere at the surface of the earth enjoys a stillness and calm, accompanied with some elevation of temperature, as well as considerable barometric and hygrometric changes, producing on the animal system the sensations of closeness, faintness, and oppression, and appearing even to the brute creation indicative of some awful and impending changes. Some of these light clouds appear stationary, as if the forces which produced contrary motions in the others made an equilibrium in these. A low murmuring and continued sound of distant thunder is soon heard, after which the lower region of the air is refreshed with cooler but light breezes of uncertain direction. The calm is resumed, but the thunder-clouds are nearer, apparently larger, and much blacker, and their influence on the nervous system is felt by an indescribable sensation of uneasiness. Lightning flashes are now perceived at short intervals; their course is sometimes zigzag, when it is called forked lightning; the aberrations in its course show that it is near terrestrial objects, and is therefore justly regarded as dangerous. In a few seconds after the discharge, heavy showers of rain or hail descend, and the atmosphere is again cooled. The blackness now becomes universal; the thunder, which before roared continuously and at a sensible interval after the discharge of the lightning, is now heard in a loud and sudden clap almost at the same instant that the lightning is seen descending towards the earth with immense velocity, and resembling a globe of flame.

These phenomena are the most common concomitants of thunder-storms, particularly in summer time. But storms are also produced by rapid changes in the atmospheric currents, for instance when the equinoctial gales usually set in; or, as in a recent instance, when the late violent and destructive gales (we write in December, 1838), crossing the Atlantic with both a revolving and progressive movement, and becoming mixed with various strata of the air through the regions which they traversed, produced in several places most destructive thunder-storms.

The colour of the lightning is a variable yellow, depending much on the density and composition of the strata of air through which the discharge takes place.

Franklin in America, and De Lomas in France, commenced, independently of each other, a series of experiments tending to identify lightning with the discharge of ordinary electricity. [ELECTRICITY.] Their identity might well be suspected from the number of analogies known to exist between them. For example, the zigzag path of the electric spark from an instrument to a conductor resembles on a small scale the course of forked lightning; both strike pointed bodies in preference to others, and lightning also prefers, cæteris paribus, the best electrical conductors. Both can dissolve metal and inflame combustibles, destroy sight and animal life, and reverse the poles of a magnet.

Franklin, in 1752, perceiving a thunder-cloud approaching, sent up a silk kite attached to a dry hempen cord. The loose threads of the cord stood erect, and upon pointing his finger to the cord, he drew sparks. When in consequence of a little rain the hempen cord became a better conductor, the supply of electricity from the cloud became more copious, and by the smartness of the shock ensuing, the danger of prolonging the experiment was sufficiently indicated.

Similar experiments were afterwards made by an assistant of Dolibard at Marly la Ville, by Canton, Wilson, Kinnersley, Bertholon, Beccaria, and many other philosophers, and the supposed identity was completely substantiated. Professor Richman of St. Petersburg attached a simple species of electrometer to his apparatus for measuring the electric intensity of a thunder-cloud. Immediately after a loud clap, he proceeded to read off the indication of his instrument, when a globe of electric fire was discharged through his body; he fell instantly on a chest quite dead, and decomposition ensued within forty-eight hours (A.D. 1753) his assistant was also much injured.

These experiments show the phenomena of electric induction or influence. [ELECTRICITY.] The clouds frequently change from negative to positive electricity; they also influence the portions of the earth near them, and sometimes so strongly as to draw the lightning *from* the earth, which is accordingly termed ascending lightning. The antients remarked this singular phenomenon, for Pliny describes the land of Etruria as emitting thunders.

When the electric discharge permeates generally the surrounding masses of weakly electrised vapour, the appearance then is that of a sudden and wide illumination, as in summer, or sheet-lightning. This lightning is harmless, and even beneficial, as indicating the restoration of atmospheric and electric equilibrium after it has been destroyed by the rapid succession of cold to heat.

The formation of vapour into rain and hail may be attributed to its violent condensation by the lightning, and the momentary vacuum in its track, the coldness produced converting the rain into hail: there are also other opinions on this subject.

The principles of electricity explain some other very curious phenomena which have been observed by travellers when near the summits of lofty mountains, as by Jalabert, Pictet, and Saussure on Mont Blanc, and Messrs. Tupper and Lanfiar on Mount Ætna. The latter running down on a field of snow (a good conductor), felt a slight electric shock as they entered a cloud which appeared electric; a pain was felt in the back, which gradually ascended to the head; the hairs (by the law of repulsion) stood erect, and upon moving the fingers near the head, a humming sound

proceeded from it, which arose from the succession of sparks. In the former case the sound appeared to play round a gilt hat-band worn by one of the travellers.

The changes of temperature, the electricity of the earth in contact with the air, and that produced by the chemical changes of the various matters of the globe, are the great causes of atmospheric electricity: thus earthquakes, volcanic eruptions, &c., are generally accompanied by violent thunder-storms.

(For further information on this subject we refer to THUNDER-RODS; also Bertholon, *De l'Electricité des Météores;* Franklin's *Letters;* Beccaria, *Lettere dell' Elettricismo;* Becquerel, *Traité de l'Electricité*, &c.)

LIGHTS, NORTHERN. In continuation of the article AURORA BOREALIS, we may add that the recommendations of the British Association have produced various good observations of these phenomena. The directions how to observe them (abstracted in the article cited) are reprinted in vol. iv., p. xxxv. of their Reports.

Of late years these phenomena seem to have become more common in England: one in particular (see Mr. Christie's communication, vol. vi., p. 29, *Rep. B. Ass.*) was observed June 24, 1837, at a time of the year in which no such appearance is recorded as observed in England. In the preceding February occurred 'one of the most extraordinary on record in these latitudes;' but during the very cold winter and spring of 1837-38 hardly any such phenomenon appeared.

By three corresponding observations (vol. ii., p. 401) of the bright arches of the aurora of March 21, 1833, it appears that these arches were 'similar to parallels of latitude round the magnetic axis.' Should further observations prove this to be a general law, no more valuable step will ever have been made towards a consistent explanation of these meteorological comets. It is to be hoped that persons living in favourable parts of the country, and disposed to observation, will not neglect to qualify themselves for observing such appearances: a single observation in connection with others made at different places may be of great value.

LI'GIA. [ISOPODA, vol. xiii., p. 55.]

LIGNIN, or vegetable fibre, is the substance which remains after a plant or a portion of it has been treated with water, weak alkaline and acid solutions, with alcohol and æther, in order to dissolve all the matters soluble in these agents.

Lignin, properly speaking, constitutes the skeleton of the trunk and branches of the tree. It varies, in different kinds, as to its colour, hardness, texture, and specific gravity; and it is probable, on account of these differences, that its composition also varies. The texture of lignin is always porous, because it contains longitudinal vessels, and it is easy to split it in the direction assumed by them. The pores of lignin, when fresh, contain the juices of different substances; during the drying of lignin the water evaporates, and leaves the matters dry which it held dissolved. It is on this account that wood contracts, in drying, in breadth, but preserves its length. It is commonly admitted that timber in general consists of ninety-six parts of lignin and four parts of the substances which were held in solution by the evaporated moisture.

When lignin has been dried, it is a non-conductor of electricity; but on account of its porous nature and the deliquescent substances which it contains, it acquires moisture when exposed to the air, and then becomes a conductor: this absorption may be prevented by varnish. It is well known that wood swims in water: but when deprived of air it becomes heavier and sinks in it; its specific gravity then varying from 1·46, which is the specific gravity of fir, to that of 1·53, the specific gravity of oak and beech. Wood is gradually decomposed when exposed to the simultaneous influence of light, air, and water; but under water it may be preserved for an almost indefinite period, as is proved by the trunks of trees which have been found in a perfect state buried in the bottom of peat-mosses, and which must have been there from a period anterior to history: also when it is kept perfectly dry it is not subject to decay. The wood enclosing Egyptian mummies is found in good preservation, although some of it must be about 3000 years old.

When wood or lignin is treated with chlorine, it becomes white, but does not dissolve. Concentrated sulphuric acid in the cold converts it into gum; and if the mass thus obtained be boiled with water, it is changed into grape-sugar. When treated with sulphuric acid, it is decomposed, becomes black owing to the separation of charcoal, while sulphurous and carbonic acid gases are evolved. When treated with strong nitric acid, oxalic acid is obtained; when boiled in concentrated hydrochloric acid, it becomes first reddish, then brown, and afterwards black, without being soluble either in the acid or in water.

The caustic alkalis dissolved in a large quantity of water act but feebly on wood; but if sawdust be treated with an equal weight of hydrate of potash dissolved in a little water, it swells, yields water with an empyreumatic smell, and a homogeneous liquid is formed; when this has cooled, it is of a blackish brown colour, and contains oxalic and acetic acids, with a substance resembling soot treated with an alkali. When wood is heated in iron cylinders with the necessary arrangements for the condensation of the volatile products, a great variety of important substances are obtained, besides charcoal: in this way are procured acetic acid, commonly called, till purified, pyroligneous acid, pyroxilic spirit, creasote, and tarry matter.

LIGNITE. Fossil wood carbonized to a certain degree, but retaining distinctly its woody texture, is thus designated: a greater degree of change constitutes cannel and common coal, in which the original structure of the constituent plants can only with difficulty be traced; a less change belongs to peat.

Dr. MacCulloch observes:—'In its chemical properties lignite holds a station intermediate between peat and coal; while among the varieties a gradation in this respect may be traced; the brown and more organized kinds approaching very near to peat, while the more compact kinds, such as jet, approximate to coal.' (*On Rocks*, p. 636.)

His synopsis of lignite runs thus:—

A. Jet. Hard, compact, with pitchy lustre.
B. Surturbrand. Less compact and more brittle than jet.
C. Moor coal of some authors. Friable.
D. Bovey coal. Fibrous, the vegetable texture very apparent, colour brown or brownish black
E. Cologne earth, earthy and pulverulent mass. The thickness said to be 50 feet.
F. Basaltic coal. Of variable structure; some parts like wood, others like coal.

Lignite often occurs in beds of considerable thickness and extent, and supplies to particular districts a bad substitute for coal. It is often accompanied by iron pyrites (Alum Bay), lies in alternating series with arenaceous and argillaceous beds, and is sometimes covered by fresh-water limestone (Käpfnach), and presents many analogies with coal; but in general lignite is most plentiful in the tertiary strata, and coal among the older rocks of the secondary series.

In the Isle of Wight (Alum Bay) lignite beds (the wood coniferous) occur amidst the sands and clays of the lower part of the (eocene) tertiary strata; in a depression of the surface near Bovey Tracey, Devon, a more considerable deposit of like nature occurs under several alternating beds of clay and gravel of considerable thickness. (De la Beche, *Geol. Manual.*) These deposits deserve attentive comparison with the peat moors of high and low situations in England, with and without buried forests, with the lignite coal of the Sussex Wealden, the coal of the Yorkshire oolites derived from equiseta, and the coal of the older rocks in which coniferous wood appears an abundant ingredient.

According to Brongniart ('Tableau des Terrains') at least three deposits of lignite of different geological ages may be distinguished in the series of tertiary strata, viz. the lignite of Switzerland, of Mont Rouge, and of Aisne (all of eocene date, according to Lyell's classification). Among the secondary strata, one deposit is noticed by Brongniart, viz. in the Isle of Aix, belonging to the lower greensand, and occurrences of less importance in the Wealden of Sussex, the Kimmeridge clay, lias, and gres bigarré. Hardly any of the clays of the cretaceous or oolitic formations are deficient of jet, which sometimes forms considerable floors (as near Whitby), but generally lies in small portions.

The plants occurring in all these deposits are terrestrial; in the Swiss and French lignites there are remains of palms; in the Meissner there are coniferous woods. Mammalia occur, especially in the Swiss lignites at Käpfnach near Zürich, where Mastodon angustidens, M. Turicense, Beaver, Rhinoceros tichorhinus, and other remains are mentioned by different writers. One of the most characteristic genera of the animals found in lignite (Tuscany, Styria) is the Anthracotherium.

LIGULATE FLOWERS, are such as have a monopetalous corolla slit on one side, and opened flat, as in the Dandelion Lilac. [SYRINGA.]

LIGU'RIA (called by the Greeks Ligystica, Λιγυστική, and the inhabitants Ligyes, Λίγυες; and Ligustini, Λιγυστῖνοι), a division of antient Italy, was separated in the time of Augustus from Etruria by the river Macra (*Magra*), and was bounded on the north and north-east by Gallia Cisalpina, and on the west by the province of Gallia. The most important places in Liguria were Albium Intemelium (*Vintimiglia*), a place of some importance, and a municipium, the capital of the Intemelii; Albium Ingaunum (*Albenga*), the capital of the Ingauni; Genua [GENOA]; Dertona (*Tortona*), in the interior, a Roman colony, surnamed Julia; Alba Pompeia (*Alba*); Asta (*Asti*); and Pollentia (*Polenza*).

The Ligures however in more antient times extended as far as the Rhone in France (Strabo, iv. 140); and 'if we may trust to the report which has been transmitted to us from the Carthaginian navigator Himilco, they dwelt upon the shores of the Atlantic Ocean, and were driven thence into the mountains, whence they descended to the coasts of the Mediterranean Sea, by the overpowering pressure of the Celts or Gauls. (Av., *Or. Mar.*, 129—145) It is evident that this tradition places them upon the banks of the river Ligyr, or Liger (the Loire).' (*History of Rome*, published under the superintendence of the Society for the Diffusion of Useful Knowledge, p. 63.) They are described by Herodotus as dwelling above Massilia (Marseille); and in the time of Polybius they reached as far south as the Arno (ii. 104, A. Casaubon). They also appear to have inhabited part of Spain. Thucydides says (vi. 2) that the Sicanians were an Iberian nation, who had been driven by the Ligurians from a river called Sicanus. There were also Ligurians among the inhabitants of Corsica (Seneca, *Consol. ad Helviam*, 8; *Fragm. Sallust. Histor.*, ii., p. 958, ed. Cortius); and a considerable part of Gallia Cisalpina was occupied by Ligurian tribes. The whole of Piedmont, in its present extent, was inhabited by the Ligurians; and Pavia, under the name of Ticinum, was founded by a Ligurian tribe, the Lævians. (Pliny, iii. 21; Niebuhr's *Roman Hist.*, i., p. 161, Engl. Transl.)

Dionysius says that the extraction of the Ligures was unknown. (i. 10.) According to Strabo (ii. 88), they were a different people from the Celts. They lived scattered through villages (Strabo, v. 151), and were celebrated as light-armed soldiers. (Strabo, iv. 140.) Cato stigmatized them as lying and deceitful (*Fragm. Orig.* ii., in Servius on *Æn.*, xi. 701, 715); but other writers speak highly of their industry, courage, and perseverance. (Cicero, *Cont Rull.*, ii. 35; Virgil, *Georgics*, ii. 167) They were not conquered by the Romans till long after the second Punic war. Strabo relates that during the space of eighty years the Romans only obtained a free passage along their shore of twelve stadia from the coast. (iv. 140.) They were finally subdued B.C. 166. (Livy, xli. 12-19; *Epit.* 46.)

LIGURITE. This mineral occurs crystallized; the primary form is an oblique rhombic prism. Fracture uneven. Hardness 5·0 to 6·0. Colour yellowish-green or apple-green. Streak greyish-white. Lustre vitreo-resinous. Translucent, transparent. Specific gravity 3·49.

It occurs in a talcose rock on the banks of the Stura in the Apennines. It is stated as a gem to be superior to chrysolite in colour, transparency, and hardness.

LI'GUUS, De Montfort's name for a genus of terrestrial testaceous mollusks belonging to the family *Helicidæ*. Mr. Gray (*Zool. Proc.*, 1834) describes a species from Africa (*Liguus tenuis*), and observes that in shape it is most like to the young of *Helix flammigera* of Férussac, but differs in colour, in tenuity, and in the shape of the front of the pillar-lip.

LILAC. [SYRINGA.]

LILIA'CEÆ, an important natural order of endogens, containing many of the most beautiful plants of that class of the vegetable kingdom. A large proportion, especially of those of cold countries, consists of bulbous plants, producing annually a stem which perishes after having produced its leaves and flowers; others have an annual duration with perennial fleshy roots; and a few acquire, in warm countries, a stem of very considerable size, as the dragon-tree, Dracæna Draco, of which there is an antient specimen in Teneriffe with a stem many feet in diameter.

The flowers of liliaceous plants are generally large and showy, especially in those with annual stems, as the lily itself, the fritillary, hyacinth, star of Bethlehem, &c.; but when they acquire an arborescent stem, the size of the flowers contracts, so that the largest trees among them have the smallest flowers. Their leaves are always quite simple and undivided; and usually have the veins of the leaves running straight from the base to the apex: but in some Dracænas they diverge from the midrib to the margin, as in the plantain. Among other endogens they are readily known by having a flower of 6 coloured pieces, 6 stamens with the anthers opening inwards, and a superior 3-celled ovary changing to a 3-celled fruit. The greater part are of no known use: we find however among them aloes, yielding the valuable purgative medicine of that name; squills (squilla maritima), whose bulbs secrete a viscid substance much employed as an emetic, diuretic, and expectorant; and several plants which yield a tough and valuable fibre, such as Phormium tenax, or New Zealand hemp, Sanseviera zeylanica, or bowstring or African hemp, Yucca filamentosa, &c. What are called alliaceous plants, such as the onion, garlic, &c., are species of this order, of which between 80 and 90 genera are known.



Tulipa sylvestris.

1, a magnified view of the stamens and pistil; 2, the pistil; 3, a transverse section of a ripe fruit, showing the cells and seeds.

LILIWATI. [VIGA GANITA.]

LILLE, the capital of the department of Nord in France, is situated on the canal of the Deule, which communicates with the Lys. It is 125 miles north by east of Paris, in a direct line, or 140 by the road through Peronne and Douay, or by that through Amiens and Arras.

Lille appears to have been founded in the eleventh century, and was then only a castle erected by the counts of Flanders, which grew to a considerable fortified town. The possession of this fortress was early an object of contention, and it has been several times besieged. The most memorable sieges were that in A.D. 1708 by the allies under Eugene and Marlborough, who obliged the governor, Maréchal Boufflers, to capitulate, after a protracted and honourable defence; and that of 1792 by the Austrians, who bombarded the town, but did not take it. Lille was the capital of La Flandre Françoise. It is strongly fortified; the citadel, a masterpiece of Vauban, is on the west side of the city. At the opposite side is fort St. Sauveur. The canal of the Deule enters the town on the south-west, where it is called Haute Deule, or Upper Deule; it is distributed into several channels for the purposes of manufacture or

commerce, and passes out of the town on the north side under the name of Basse Deule, or Lower Deule. A canal called Moyenne Deule, Middle Deule, passes on the west side of the city, and affords a passage from the Upper to the Lower Deule for those which are too large to pass through the narrow channels in the town. The town is well laid out: there are nearly thirty market-places or other open places, of which La Grande Place is the chief. The markets, especially the fish-market, are well arranged. The greater part of the streets (which amount to 200, besides lanes, alleys, &c.) are wide: Rue Royale is the longest and straightest street, and Rue Esquermoise the best furnished with shops and the most frequented. The houses are in general of three or four stories, regularly built, and with good fronts: they are chiefly of brick, but sometimes of a white stone quarried at Lezennes in the neighbourhood. There are numerous bridges over the canals, and quays on their sides. There are six parish churches, of which the finest are those of La Madeleine (Magdalen), with a handsome cupola, St. Maurice, and St. Andrew. There are also a Protestant place of worship and a Jews' synagogue. Formerly there were many religious houses. Among other public buildings, the most remarkable are the préfet's office, a handsome new building; the custom-house, formerly a Dominican monastery; the 'grand magazin du blé,' or public granary; the bourse, or exchange; the theatre, which has a handsome peristyle; and the court-room, one of the finest in France, built upon part of the site of an antient church. The town-hall is an ill-assorted mixture of the architecture of different ages. The gate of Paris is a handsome triumphal arch.

In 1831 the population of Lille was 69,073; in 1836 it was 72,005, including the population of the five suburbs of Paris, Bethune, La Barre, Fives, St. Maurice, and St. André. The manufactures are of great importance. There were, ten years ago, 150 establishments for spinning cotton-yarn, a branch of industry which has in some degree superseded the manufacture of lace, one of the former staple articles of the town. Calicos, printed cottons, counterpanes, table-linen, bed-ticking, fine woollen cloths, velvets, serge, camlets, and other woven fabrics, are made; also hats, laces, and hosiery. There are several sugar-refining houses, a royal tobacco manufactory, and a royal refining-house for saltpetre and gunpowder, and manufactories for machinery, paper, glass, soap, starch, sulphuric and nitric acid, and rape and poppy oil. There are some potteries and other earthenware manufactories, several tan-yards, and a number of iron-works. There are a great number of oil-mills in the neighbourhood. The trade of the place is very great: several of the merchants are ship-owners, or take part in fitting out vessels from the ports of Dunkerque, Calais, and Ostend. There is one yearly fair, which lasts nine days.

Beside the public establishments already enumerated there are several hospitals. The general hospital is a handsome regular building; the military hospital occupies the former Jesuits' College; and the hospital for infirm old men and orphan boys is a very antient establishment, founded by the Countess Jeanne, daughter of the emperor Baudouin or Baldwin IX. of Constantinople, in the thirteenth century. There are at least two other hospitals, besides one for foundlings, a 'mont de piété,' or loan society, a lying-in charity, two lunatic asylums, one for males, the other for females, an asylum for poor girls, and three houses of the 'Sœurs de Charité.' There are also three houses of correction or prisons. Of literary institutions there are a considerable number, including a public library of 20,000 volumes, a cabinet of paintings, and a museum of natural history; a botanic garden, at which lectures are given, a high school, a school for drawing, modelling, architecture, and botany, and an academy for music. The head-quarters of the 16th military division, which includes the departments of Nord, Pas de Calais, and Somme, are at Lille.

The environs of the town are flat, but very productive. The arrondissement has an area of 337 square miles, with a population in 1831 of 294,541, and in 1831 of 309,349. It is divided into 16 cantons and 131 communes.

LILLO, GEORGE, was born in 1693, and carried on the trade of a jeweller near Moorgate in London. Though educated in the strict principles of the Protestant Dissenters, he produced seven dramas, three of which are printed in every collection of acting plays. He died in 1739.

In the three plays, 'George Barnwell,' 'Arden of Feversham,' and 'Fatal Curiosity,' the author evidently has but one purpose in view, to exhibit the progress from smaller to greater crimes. Thus the impure passion of Barnwell, the ill suppressed attachment of Arden's wife for the lover of her youth, and the impatience under poverty of the Wilmots (in 'Fatal Curiosity'), are the three beginnings of vice, all of which terminate in murder. Not only is the purpose of these plays the same, but the same measures are adopted in all for its attainment. In all there is a tempter and a tempted; the first determined in vice, the latter rather weak than intrinsically vicious: thus Barnwell is led on by Milwood; Arden's wife by her paramour Mosly; and Wilmot by his wife Agnes. Now Lillo having an eminently tragic idea, and one only, it might easily be inferred that he could write one and only one good drama; and this was actually the case. His 'Fatal Curiosity' stands as a masterpiece of simple dramatic construction, and the catastrophe is eminently appalling and tragic. The following is the subject: A man and his wife, who have formerly been wealthy, but are now sunk to a deplorable state of poverty, receive a stranger who asks for a lodging. Finding that he has wealth about him, they murder him, and afterwards discover that he is their own son, who has been absent many years, and who has concealed his name that he may give his parents a joyful surprise. This simple story is arranged with the most consummate art, being scarcely inferior in construction to the 'Œdipus Tyrannus' of Sophocles, with which Harris, in his 'Philological Enquiries,' has compared it. He observes that in both, the means apparently tending to happiness (namely Œdipus sending to the oracle, and Wilmot's son returning), in reality produce misery. The language is by no means equal to the construction, but is often inflated, and disfigured by conventional similes and expressions, which destroy every possibility of enunciating true feeling: characters under the most acute mental agonies seem, strangely enough, to be building elaborate and affected phrases. It is this assumption of a stilted style which has prevented the representation of nature in her various gradations in so many tragedies; for where all the personages talk in one conventional language, it is almost impossible to represent the variations of character and passion. However, there are passages and touches in the 'Fatal Curiosity' which show that had it not been for a defect in taste, Lillo could have taken a high position by this one drama, and revealed many secrets of the human heart. With respect to his other two plays, though the construction of 'George Barnwell' is skilful, and the situation in the fifth act of 'Arden' most powerful, they stand at an immeasurable distance below 'Fatal Curiosity.' The tendency to inflation, though apparent in the last, was in a great measure repressed by the shortness of the piece (it is in three acts) and by the severe simplicity of the subject; but in Arden it increases with the length of the drama, and in 'George Barnwell' inflation has no bounds; nature is sunk altogether, and the virtuous characters are not human beings, but speakers of moral essays, and those in the worst style. The prose of 'Barnwell' is remarkable; in many places line after line will read as blank verse, which might lead to a surmise that it was originally written in verse, and chopped up into prose, unless indeed the semi-metrical style may be that which naturally follows from inflated declamation. It is singular enough that 'Fatal Curiosity,' which appears the simplest expression of Lillo's idea, did not make its appearance till six years after 'Barnwell,' which is like the work of one who has exhausted his mind, and endeavours to make up for paucity of ideas by a weight of useless language.

There are several anecdotes relative to the effect produced by 'George Barnwell' on young men who have pursued vicious courses and have been reclaimed by this tragedy. It is usually acted at some of the theatres in London on the night after Christmas, and on Easter Monday, nominally for moral purposes, but really in blind pursuance of an old custom, as the boisterous holiday folks, who are impatient for the spectacle that on such occasions follows the tragedy, invariably make such a noise during the whole representation that it is acted in dumb show, and not only conveys no moral, but is perfectly unintelligible.

A collection of Lillo's works was published in 2 vols. 8vo. in 1775.

LILLY, WILLIAM, was born May 1, 1602, at Diseworth, a village of Leicestershire. When eleven years old he was sent to a grammar-school at Ashby-de-la-Zouch. His

parents being poor, he removed to London in 1620, where he became servant to a mantua-maker. This situation he exchanged in 1624 for one of a less menial character. His new employer was master of the Salter's Company, who, being unable to write himself, engaged Lilly to keep his accounts, and to perform domestic offices. In 1627 his master died, whereupon Lilly married the widow, with whom he received the sum of 1000*l.*; but this lady dying within a few years, he immediately took another wife, and thus augmented his fortune by 500*l.* In 1632 he began the study of astrology under one Evans, a clergyman who had been expelled from his curacy for practising numerous frauds under pretence of discovering stolen goods. The fame which Lilly soon acquired for casting nativities and foretelling events was such, that he was applied to, in 1634, to ascertain, 'by the use of the Mosaical or Miner's Rods,' whether there was not extensive treasure buried beneath the cloisters of Westminster Abbey. Permission having been obtained from the dean on condition that he should have his share of whatever might be found, 'Lilly and thirty other gentlemen entered the cloisters one night and applied the hazel rods;' but after they had disinterred a few leaden coffins, a violent storm arose, which so alarmed them, that they all took to their heels and ran home. In 1644 he published his first almanac, by the title of 'Merlinus Anglicus, Junior,' and such was the avidity with which the people received his prognostications, that the whole edition was sold in a few days, notwithstanding the 'mutilations the work had suffered from the licenser of mathematical works.' Lilly was subsequently arrested by the commissioners of the excise, on the ground that they had been personally insulted 'by having their cloaks pulled on 'Change,' and that the Excise-office had been burnt, both which events were attributed to the malicious predictions contained in his treatise called 'The Starry Messenger;' but upon its being proved that these events had happened prior to the publication of the work complained of, he regained his liberty. During the contest between Charles I. and the parliament, Lilly was consulted by the Royalists, with the king's privity, as to whether the king should sign the propositions of the parliament, and he received 20*l.* for his opinion. At the same time he was employed by the opposite party to furnish them with 'perfect knowledge of the chiefest concerns of France,' for which he received 50*l.* in cash and an annuity of 100*l.* per annum. The latter he enjoyed only two years. Until the affairs of Charles declined he was a cavalier; but after the year 1645, he engaged heartily in the cause of the parliament, and was one of the close committee to consult upon the king's execution.

After burying his second wife and marrying a third, he died of palsy, June 9, 1681, and was buried at Walton-upon-Thames. A tablet was placed over his tomb in the chancel of the church, with a Latin inscription commemorating his great astrological skill. Previous to his death he had adopted a tailor for his son by the name of Merlin Junior, to whom he bequeathed the impression of his almanac, which had then been printed thirty-six years. 'Most of the hieroglyphics,' says Mr. Aubrey, 'contained in this work were stolen from old monkish manuscripts. Moor, the almanac-maker, has stolen them from him, and doubtless some future almanac-maker will steal them from Moor.' The character of Lilly has been faithfully drawn by Butler under the name of Sidrophel, although some authors have supposed that character to have been intended for Sir Paul Neal. By the facility with which he was enabled to impose upon the ignorance and superstition of all ranks of society, from the highest to the lowest, he succeeded in amassing considerable wealth. He was, to use the epithet of Dr. Nash, 'a time-serving rascal,' who did not hesitate to resort to any kind of deceit, and even perjury, in order to free himself from a dilemma or gratify his love of money and renown. After the Restoration he made several applications to the ministry to be employed as a prophet, in which capacity he had been so liberally patronised by the previous government, but in every instance he had the mortification of being refused.

For a list of his published works the reader is referred to Dr. Hutton's 'Mathematical Dictionary.'

(*Biographia Brit.*, fol., vol. v., p. 2964; Granger's *Biog. Hist.;* Wood's *Athenæ Oxonienses;* Nash's Notes to *Hudibras*, 4to. edit., 1793, vol. iii.)

LILY, LILYE, or LILLY, WILLIAM, an eminent schoolmaster, was born at Odiham in Hampshire, about 1466, and at eighteen years of age was admitted a demy of Magdalen College, Oxford. Having taken the degree of B.A., he quitted the University, and travelled towards the East, with the intent of acquiring a knowledge of the Greek language. He certainly remained five years at Rhodes, but it is not quite so certain, as Pits and Wood assert, that he went for religion's sake to Jerusalem. From Rhodes he went to Rome and studied. On his return to England in 1509, he settled in London, set up a private grammar-school, and became the first teacher of Greek in the metropolis. His success and reputation were such, that, in 1512, Dean Colet, who had just founded St. Paul's school, appointed him the first master. He filled this useful and laborious employment for near twelve years, and in that time educated some youths who afterwards rose to eminence in life, among whom were Thomas Lupset, Sir Anthony Denny, Sir William Paget, Sir Edward North, and Leland the antiquary. Lily died of the plague, at London, in February, 1523, at the age of 54, and was buried in the north church-yard of St. Paul's. Lily's principal literary production was his 'Brevissima Institutio, seu Ratio Grammatices Cognoscendi,' 4to., Lond., 1513. It has probably passed through more editions than any other work of its kind, and is still commonly known as 'Lily's Grammar.' The English rudiments were written by Colet, and the preface to the first edition by Cardinal Wolsey. The English Syntax was written by Lily; also the rules for the genders of nouns, beginning with 'Propria quæ Maribus;' and those for the preterperfect-tenses and supines, beginning with 'As in præsenti.' The Latin Syntax was chiefly the work of Erasmus. See Ward's Preface to his edition of Lily's Grammar, 8vo. Lond., 1732. Lily numbered Erasmus and Sir Thomas More among his intimate friends. (Wood, *Athenæ Oxonienses*, Bliss's edit.; Chalmers's *Biogr. Dict.;* Tanner, *Bibl. Brit. Hib.*)

LILYBŒUM. [SICILY.]

LIMA, the capital of the republic of Peru in South America, is situated in 12° 2′ 34″ S. lat. and 76° 58′ W. long., about six miles from its port Callao, which is on the shores of the Pacific. [CALLAO.] The road from Callao to Lima rises gradually, and the great square of the capital is 560 feet above the level of the sea. Lima is built in a spacious and fertile valley, traversed by a small river called Rimac, a name which has been corrupted by the Spaniards into Lima. The river washes the northern walls of Lima, and over it there is a handsome stone bridge leading to the suburbs of St. Lazaro, and to the Alameda, or public walk. The city is walled round, but the walls are low, and were originally erected to protect it against any sudden incursions of the Indians. The houses are low, and have rarely more than one floor: they are lightly built, on account of the frequent earthquakes, which have repeatedly reduced the city to ruins. The streets are regular and wide, but the pavement is extremely bad, consisting of large round stones, laid without the least regularity. There are no flags for foot passengers. The number of houses with glass windows towards the streets is on the increase, but they are not yet numerous. The roofs are made of coarse linen cloth or cane, the total want of rain rendering more substantial roofs unnecessary. The city occupies a nearly triangular space, the base or longest side extending along the banks of the river. A fine street leads from the bridge to the Plaza Mayor, or great square, in the midst of which is a large fountain, with a bronze statue of Fame in its centre, and at its angles four small basins. On the north side of the square is the government palace, formerly occupied by the viceroys; it is a large but gloomy-looking edifice. On the east side of the square are the cathedral and the archiepiscopal palace; the former is a handsome building of considerable extent. On the west side, which faces the cathedral, is the town-hall and the city prison; the south side is occupied by private houses, generally built in a good style.

Lima has fifty-six churches, and before the revolutionary war there were forty-six convents of monks and nuns; but most of them have since been abolished. It is not deficient in institutions for the instruction of the higher classes, having three colleges or higher schools, a college of medicine and surgery, a university, and a botanic garden. There are also several charitable institutions, and among them sixteen hospitals for sick persons and two foundling hospitals. Great sums of silver have been coined at different times in the mint of Lima.

The population amounts to about 70,000 persons. The number of creoles is about 25,000, and they constitute the most numerous class of inhabitants. There are 15,000 free mulattos, and an equal number of slaves. The Indians and mestizos living in the city and suburbs amount to nearly 12,000. The manufactures are not numerous nor extensive. The principal manufactured articles are utensils and vessels of silver, gilded leather, and cotton-cloth; gold lace and epaulettes are of excellent workmanship. Among the creole inhabitants are many rich families who owe their fortunes to the mines, and are now large landed proprietors. Though the produce of the mines has greatly fallen off, gold and silver still constitute the principal articles which are sent to foreign countries. (Ulloa, *Voyage to South America;* Humboldt; Meyen's *Reise um die Welt; Haigh, Sketches of Buenos Ayres, Chile, and Peru; Campaigns in Venezuela,* &c.)

LIMA. (Zoology.) [PECTINIDÆ.]

LIMACELLA. [LIMACINEA; LIMAX.]

LIMACI'NA. [HYALÆIDÆ, vol. xi., p. 372.]

LIMACI'NEA, M. de Blainville's name for his third family of *Pulmobranchiata*, the first order of his second subclass, *Paracephalophora Monoica.* M. de Blainville thus defines the family ('Genus *Helix,* Linn.'):—

Animal very variable in form; the *head* provided with two pair of *tentacula* completely retractile into the interior, the posterior pair longest, carrying the *eyes* on their extremities; one *tooth* in the upper lip; the *lingual* mass small and covered with a skin beset with microscopic teeth.

Shell of a form as variable as the body of the animal, rarely subampullaceous, often normal, oval or globular, sometimes turriculated, pupaceous or discoïd, almost constantly without an epidermis, rarely hairy (velue), with the summit always blunt; the aperture round, semilunar, oval or angular, but never notched.

M. de Blainville adds, as an observation, that all the animals of this family are terrestrial, and that all feed on vegetable substances.*

The following are the genera comprehended under the *Limacinea* in the 'Malacologie' of the author above quoted:

Succinea, comprehending also *Amphibulimus* of Lamarck.

Bulimus, comprehending also *Bulimulus* of Leach.

Achatina, comprehending also the genera *Liguus* of Denys de Montfort, and *Polyphemus* of the same author.

Clausilia.

Pupa, comprehending also the genera *Chondrus* of Cuvier, *Gibbus* of Denys de Montfort, *Vertigo* of Müller, and *Partula* of De Férussac.

Tomogeres of De Montfort (*Anostoma* of Lamarck).

Helix, comprehending the genera *Carocolla,* Lam.; *Iberus,* De Montf.; *Caracolus,* De Montf.; *Acavus,* De Montf.; *Helicella,* Lam.; and *Zonites,* De Montf.

Helicolimax (Vitrine), including the genus *Helicarion* of De Férussac.

Testacella.

Parmacella.

Limacella.

Limax, including the genera *Arion,* Fér.; *Philomique,* of Rafinesque; and *Eumèle,* of the last-named author. And

Onchidium, including *Veronicella,* Blainv. [HELICIDÆ; LIMAX.]

LIMAX, the Latin name for those air-breathing naked gastropodous mollusks, so injurious to the agriculturist and horticulturist, vernacularly known by the name of *Slugs.*

Linnæus employed the term *Limax* as a generic appellation for the *naked slugs,* placing the genus at the head of his (*Vermes*) *Mollusca,* and comprehending under it eight species, all terrestrial excepting the last, viz. *L. papillosus,* to which he assigns the European Ocean as a locality, adding that the animal is submarine, and should probably be rather referred to the genus *Doris.*

The following is the definition given by Linnæus:—

Body oblong, repent, with a fleshy shield above and a longitudinal flat disk below. A dextral *lateral foramen* for the genitals and excrements. Four *tentacles* above the mouth. ('Syst. Nat.' ed. 12, 1767.)

In addition to this employment of the term, Linnæus used the word *Limax* to designate the soft parts of most of the genera of his (*Vermes*) *Testacea,* indeed of all that progress upon a flattened disk or *foot,* marine as well as terrestrial; for the very imperfect information of the time when he wrote did not enable him to make those distinctions which modern zoologists have pointed out, aided by more copious materials, and by the labours of accurate zootomists and observers bestowed upon those materials. Thus we find in the 'Systema Naturæ,' '*Conus.* Animal Limax.'—'*Cypræa.* Animal Limax.'—'*Bulla.* Animal Limax.'—'*Voluta.* Animal Limax.' In short, the animal of each genus of his '*Univalvia spirâ regulari,*' with the exception of *Argonauta* and *Nautilus,* is stated to be a *Limax,* and the same animal is also assigned to *Patella,* which stands at the head of his '*Univalvia absque spirâ regulari.*'

Cuvier, in the first edition of his 'Règne Animal' (1817), places the '*Limaces*' (*Limax,* Linn.) at the head of his *Pulmonés Terrestres,* nearly all of which he describes as having four tentacles; two or three only of very small size not having exhibited the lower pair—'n'ont pas laissé voir la paire inférieure.' Those among them, he adds, which have no apparent shell formed, according to Linnæus, the genus *Limax,* which Cuvier subdivides into the groups of the *Limaces,* or slugs properly so called (*Limax,* Linn.); the *Testacelles* (*Testacella,* Lam.); and the *Parmacelles* (*Parmacella,* Cuv.). In the last edition of the 'Règne Animal' (1830), he adds under *Limax* the subdivisions distinguished by De Férussac, viz. *Arion* and *Vaginulus.*

In both editions he describes the *Limaces proprement dits* as having an elongated body, and for a mantle a fleshy compact disk, which occupies the anterior part of the body alone, and covers the pulmonary cavity only. This disk contains, he adds, in many species, a small oblong and flat shell, or at least a calcareous secretion in lieu of it. The orifice of respiration is on the right side, towards the front, and the anus is pierced at its posterior border. The four tentacles are put forth and withdrawn by unrolling themselves (en se déroulant) like the fingers of gloves, and the head itself can be withdrawn in part under the disk of the mantle. The organs of generation open under the right upper tentacle. There is but one jaw (upper), in the form of a dentilated crescent, which serves them to gnaw with much voracity the herbs and fruits to which they do so much damage. Their stomach is elongated, simple and membranous.

Lamarck ('Histoire Naturelle des Animaux sans Vertèbres,' tom. vi., part ii., 1822) thus defines his *Limaciens:*—Branchiæ creeping (rampantes), under the form of a vascular net upon the wall (paroi) of a particular cavity, the aperture of which is a hole which the animal contracts or dilates at its pleasure. They respire the free air only.

The same zoologist remarks that the *Limaciens* constitute a natural family and a very remarkable one, inasmuch as the animals which compose it are the only ones among the Gastropods whose respiratory organ, which is truly branchial, breathes nothing but free air, and he thence names them *Pneumobranches.* These mollusks, he continues, are naked or nearly entirely naked. Their body is elongated, creeping upon a ventral disk which is not separated from it, and bordered on the sides by a mantle which is most frequently very narrow. Originally from the waters (originaires des eaux*), they live habitually in their neighbourhood; but some inhabit, nevertheless, places which are at a distance from the water, but nearly always in cool and humid localities. They have accustomed themselves (ils se sont accoutumés) to breathe air with their *branchiæ;* so that this habit has become a necessity to them. Here it is, for the first time, as regards the mollusks, that the free air is the fluid breathed. This fluid penetrates by a hole, and without either *trachea* or *bronchiæ* into a particular cavity which is not divided into many partitions (loges) or cellules, but on the walls of which little lace-like vessels or a vascular net-work (des cordonnets ou des lacis de vaisseaux) creep in divers forms and receive the influence of the respiration. A similar or analogous cavity is found in a great number of the *Trachelipods;* but in those which respire air only, the influence of this fluid, being very superior to that of water, requires in the organ presented to it only a very small surface. Thus the vascular lace-like work (cordonnets vasculaires) which creeps over the walls of the cavity, and

* But note—Testacella, which M. de Blainville includes in the family, feeds principally on earth-worms.

* Here Lamarck's system of progressive development, &c. and the effect it had upon his views peeps out. See his Life, ante, p. 280. He here pronounces terrestrial animals to be 'Originaires des eaux,' and would have us believe that having accustomed themselves—why, he does not tell us—to breathe air, the habit has become a necessity, and so they have become terrestrial.

which in that respect resembles the same parts in the Limacians, project very little; whilst in those which respire water only the cavity offers very projecting and vascular parts (such as pectinated laminæ of different sizes) to the influence of the fluid respired. The branchial cavities of which we are speaking, even that which is adapted for breathing air only, cannot be reasonably confounded with a lung, which is a respiratory organ of a particular fashion, adapted to organizations of a superior order, an organ which is essentially cellular, and into which the fluid respired is introduced at least by an internal *trachea*, and often by *bronchiæ* besides. This modification, then, of the respiratory organ has peculiar characters which *branchiæ* or gills, whatever be their form and situation, never offer. If, in order to determine the name or the kind (espèce) of a respiratory organ, that organ is considered only with reference to the fluid respired, then all animals which respire free air may be said to possess a lung; but if, in order to facilitate the study of the different modifications of organs which serve for respiration, and in order to seize the means which nature has employed to effect the progressive composition of the animal organization as well as its perfection, one considers the characters proper to each sort of respiratory organ, it will be then evident that no mollusk nor any other invertebrate animal respires by means of a lung, although many among them respire the free air. Besides, independently of the particular and well-known structure of every lung, the air never penetrates except by the mouth of the animal, whilst in every respiratory organ distinct from a lung the fluid respired, whatever it be, is always introduced by another passage. To confound objects so different, each of which is appropriated to the degree of organization to which it belongs, and can only exist in an organization of that degree, is, in our opinion, to render the knowledge of the order of nature in her productions impossible. In fact, in the course of the animal kingdom, such a function could not be executed except by an organ or system of organs differently modified, because it must be in relation with the state of organization of which it forms a part.

To return, continues Lamarck, to the particular object before us, I will say that *branchiæ*, although they present themselves under a multitude of forms and different situations, never resemble, notwithstanding, a lung. This respiratory organ, then, is peculiar; and we know that it has the power of habituating itself to respire air. In fact many crustaceans which live nearly constantly on land respire there this last fluid only with their *branchiæ*. If the *Colimacés*, as well as the *Limneans*, have a branchial cavity similar to that of the *Limacians*, and breathe the free air only, this cavity is also the same as that of the *Melanians* and other *Trachelipods* which breathe water only. But in the first the respiratory organ presents a small surface only to the fluid respired; whilst in the second the organ in question offers a much larger extent of surface. In each case these organs are always branchial, but adapted to the power of the influence of the fluid respired, and situated in analogous cavities.

Thus far Lamarck, who concludes by comprehending under his *Limacians* the following five genera: *Onchidium*, *Parmacella*, *Limax*, *Testacella*, and *Vitrina*.

The second section of the *Limacineans* of M. de Blainville, or those which have the anterior border of the mantle enlarged into a species of buckler, the shell being null or nearly membranous, consist of the genera *Vitrina* or *Helicolimax*, *Testacella*, *Parmacella*, *Limacella*, *Limax*, and *Onchidium*, together with their subdivisions, as noticed in the article LIMACINEA. With regard to the marine species, which Cuvier has approximated to these, M. de Blainville observes that they constitute his genus *Peronia* in his order of *Cyclobranchians*. [CYCLOBRANCHIATA, vol. viii., p. 249.]

M. de Férussac's conclusions on the subject of the *Limacidæ* may be gathered from the present article and that on HELICIDÆ, as may be the opinions of Mr. Gray on the distinction between *Arion* and *Limax* pointed out by De Férussac, and Mr. Gray's views with regard to the *Arionidæ* and *Limacidæ*. [HELICIDÆ, vol. xi, p. 109.]

M. Rang arranges the *Limaces* of De Férussac (*Limaciens* of Lamarck, *Limacinés* of De Blainville, *Nudilimaces* of Latreille), as the first family of the *Pulmonés Inoperculés* of De Férussac (*Pulmobranches* of De Blainville), and makes it consist of the genera *Onchis*, Fér.; *Onchidie*, Cuv.; *Peronia*, De Blainv.; *Onchidium*, Buchanan; *Veronicella*, De Blainv.; *Vaginulus*, De Fér.; having a general cuirass:

The genera *Limacella*, Blainv.; *Limax*, Lam. (including *Arion*, Fér.); *Parmacella*, Cuv.; which have a partial cuirass: and

The genus *Testacella* (including the *Plectrophore*) of Férussac, which is without any cuirass.

M. Deshayes, who praises Lamarck's observations on the nature of the respiratory organ of the terrestrial mollusks which breathe air, remarks (second ed. of Lamarck, tom. vii., 1836), at the end of Lamarck's account of the *Limacians* above stated, that since the publication of the work of the latter many important treatises have been published both on the family of the *Limaces* and on the terrestrial mollusks taken as a whole. The most complete and the most important of these works is, he observes, most certainly that of M. de Férussac, although it may not be without some grave faults. The finished parts, laying aside the systematic ideas of the author, offer a very satisfactory collection of observations for the study of the terrestrial mollusks. After adding that the friends of science ought to regret that there remains so much to be done in order to finish this great scientific enterprise, M. Deshayes proceeds as follows:—'We have already censured in the method of Lamarck the separation of the *Gastropods* and the *Trachelipods*, a separation artificial and useless, especially as regards the grand series of mollusks, where this division is the less tolerable, because there it is that the passage of the *Gastropods* properly so called and of the *Trachelipods* is effected in the most imperceptible manner and by means of a curious series of modifications. Cuvier, who, in his memoir on the *Limaces* and *Helices*, has justly advanced the proposition that there scarcely exist any zoological characters proper for the distinction of these two genera, could not coincide in the opinion of Lamarck, and in this he was wisely imitated by the greatest number of zoologists. M. de Férussac collected into two orders all the air-breathing mollusks, according as they were or were not provided with an *operculum*. Those which are operculated are few, and consist of two genera only, which we find among the *Trachelipods* of Lamarck. Those which are not operculated comprise a considerable number of genera grouped in families. The first is that of the *Limaces*, corresponding, exactly enough, with the family of *Limacians* of Lamarck. It comprehends however twelve genera, whilst that of Lamarck only contains five; but when we come to examine attentively these different genera admitted by M. de Férussac, we soon perceive that many are too uncertain to be definitely adopted. M. de Blainville himself has rejected many of the genera of this family which he had at first adopted; and in his 'Treatise on Malacology' he has reduced them to five. M. Cuvier, in the last edition of the 'Règne Animal,' has not adopted more than the genus *Vaginulus*, to which M. de Blainville has given the name of *Peronia*, which occasions a sad confusion in nomenclature. It will suffice, then, to add the genus *Vaginulus* to the family of *Limacians* of Lamarck, to render it as complete as the most positive observations require.'

Mr. Gray, as we have seen in the article *Helicidæ*, is of opinion that, at present, only a few genera, as *Arion* and *Helicarion*, Fér., *Nanina*, Gray, and *Stenopus*, Guilding, can be referred with certainty to the *Arionidæ*, though he thinks it very probable that, when the animals of other shells are known, many of them may be found to belong to that family. In this state of our information we shall confine ourselves in this article to those forms of the naked truly terrestrial *Limacidæ* which are, for the most part, popularly known under the name of *Slugs*, and shall notice the genera with external shells under their respective titles, though we quite agree in the principle of the general similarity of the zoological characters of the *Limaces* and *Helices*, and the almost imperceptible gradation of form among them.

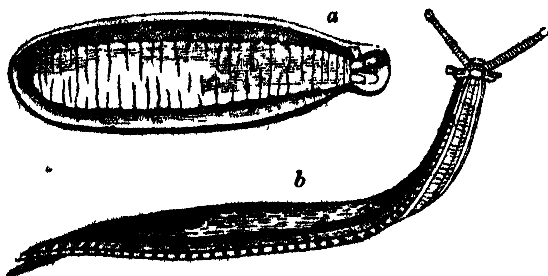
Vaginulus. (Férussac.)

Animal oblong, elongated, often very slender in its state of extension, convex above; a *cuirass* covering the whole of the body, extending beyond it, and forming in front a sort of hood, wherein the head can be withdrawn; *mouth* armed with an upper jaw; four contractile *tentacles*, the two upper ones long and oculiferous, the anterior short and, as it were, palmated or bifurcated at their extremity; the *foot* oblong, elongated; the *respiratory cavity* towards the middle of the body having its orifice behind, at the extremity of a long canal, and separated from the *anus* by a mem-

brane only; *organs of generation* very distinct on the right, the male organ being near the small tentacle, and the orifice for the eggs towards the middle; no terminal mucous pore.

Shell null, there being neither rudimentary internal shell nor calcareous concretion. (Rang.)

Example. — *Vaginulus Taunaisi* (*Onchidium læve*, Blainv.).



Vaginulus. *a*, the animal contracted—under-side; *b*, the animal extended and in progression.

Geographical Distribution of the Genus.—East and West Indies. M. Rang, who remarks that they have been said to be both terrestrial and fresh-water, states that he never met with them in Bourbon and Martinique, except in the woods and gardens under old fallen trunks.

There is great confusion about the nomenclature of *Onchidium*, *Peronia*, *Veronicella*, and *Vaginulus*. Cuvier observes that *Vaginulus* is different from *Onchidium*, with which M. de Blainville has united it, at the same time that he has detached the true *Onchidia*, to form his genus *Peronia*. It appears in fact, as M. Deshayes observes, that M. de Blainville has made of the marine *Onchidia* of Cuvier his (De Blainville's) genus *Peronia*, which he places in his family *Cyclobranchiata* near *Doris*, and that he collects the fresh-water species under the genus *Vaginulus*, to which he unites his genus *Veronicella*, which last he has himself rejected.

Limacella. (De Blainville.)

We give a figure and description of this genus, premising that M. de Blainville himself, who separated it, says, that the combination of characters appears to him so anomalous that he doubts really whether he had well observed the mollusk on which he has established the genus. M. Rang however gives it a place in the family, merely copying the description and M. de Blainville's expressions of doubt above stated.

Generic Character.—*Animal* elongated, subcylindrical, provided with a foot as long and as large as itself, from which it is separated only by a furrow; enveloped in a thick skin, forming at the anterior part of the back a sort of buckler for the protection of the pulmonary cavity, the orifice of which is at its right border; the orifices of the generative apparatus distant, that of the oviduct at the posterior part of the right side, and communicating by a furrow with the termination of the male organ, situated at the root of the right tentacle.

Example, *Limacella Elfortiana*.



Limacella Elfortiana.

Limax.

Animal oblong, more or less elongated, demicylindrical, furnished with a cuirass at the anterior part; head sufficiently distinct, retractile under the cuirass, carrying two pairs of tentacles equally retractile, terminated in a rising (bouton), the upper pair long and oculiferous, the lower pair short; foot great and oblong, the pulmonary cavity situated under the cuirass, and opening under its right border; orifice of the anus at the posterior border of that of the respiratory cavity; organs of generation united and showing themselves at the right side anteriorly, near the great tentacle; sometimes a terminal mucous pore.

Shell.—A rudimentary internal shell, or calcareous concretions in the thickness of the cuirass.

Such is the general definition of *Limax* by M. Rang. He observes that M. de Férussac seized on certain anomalies in the characters of these mollusks, which led the latter to separate a certain number, out of which he forms his genus *Arion*. M. Rang observes that this distinction has not been adopted by M. de Blainville, excepting for the establishment of two sections; but M. Rang thinks it better to form the whole into two subgenera, viz. *Arion*, Fér., and *Limax*, the latter consisting of the slugs properly so called.

M. de Blainville divides the genus *Limax* into four sections: the 1st consisting of those species in which the pulmonary orifice is very anterior, the tail carinated, and the rudiment of the shell most evident. This section consists of the *Grey Slugs*; and *Limax griseus* is given as an example.

The 2nd section consists of species whose pulmonary orifice is more posterior; the tail not carinated, hollowed at its extremity into a blind sinus, and the rudiment of the shell granulous. This section consists of the *Red Slugs* (genus *Arion*, De Fér.). The example given is *Limax rufus*.

The 3rd section consists of species whose buckler is not distinct, and which have the ocular tentacles club-shaped, and the others lateral and oblong (genus *Philomique* of Rafinesque). The example given is *Limax Oxyurus*.

The 4th section comprehends those species whose buckler is not distinct, and which have the two pairs of tentacles cylindrical, nearly on the same line, the smaller ones being between the greater (genus *Eumeles*, Rafinesque). The example given is *Limax nebulosus*.

The two last sections are not noticed by M. Rang; and Cuvier is of opinion that the two genera recorded by M. Rafinesque are too imperfectly indicated to be admitted into his (M. Cuvier's) work. M. Rang also declines to admit them till there is more information on the subject.

Subgenus *Arion*.

Respiratory orifice situated comparatively forward, towards the anterior part of the buckler, which is rough (chagrinée) and contains small calcareous concretions. There is a terminal mucous pore.

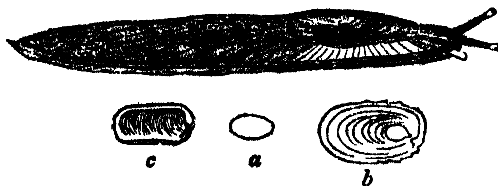
Example, *Arion rufus*, Fér., *Limax rufus*, Linn. This species is sometimes nearly quite black.



Arion rufus. Red Slug.

Subgenus *Limax*.

Respiratory orifice situated comparatively backwards; the buckler is marked with fine and concentric striæ, containing a testaceous rudiment which is solid but without any volutatory impression. There is no terminal mucous pore. Example *Limax antiquorum*, Fér., *Limax maximus*, Linn., *Grey Slug*.



Limax antiquorum, Fer., Limax maximus, Linn., Grey Slug. *a*, internal shell; *b*, the same enlarged; *c*, internal view of the shell from another individual.

Geographical Distribution of the Genus very wide; but the northern and temperate countries of both continents seem to be plagued with a greater number than those of the torrid zone. They are found in Africa, and have been noticed at each extremity of that quarter of the globe. MM. Quoy and Gaimard describe some from New Holland, and M. Rang saw them in India and in the Isle of France.

Utility to Man.—The species of this genus can hardly be of any direct utility to man, with the exception of the supposed virtues of a decoction or 'bouillon' of *Red Slugs* in disorders of the chest, whilst the injury which they inflict on the garden and the field is most devastating, notwithstanding the number of birds which prey upon them. Gardeners are constantly racking their invention to free themselves from these devouring hosts. Quicklime, soot, fine coal ashes, and saw-dust have been used as defences for young

and tender plants. The virtue of the first is soon exhausted and the slugs do not care much for the second after awhile, but if the soot be plentifully and frequently renewed it will keep them away in great measure. Coal-ashes, not too coarse, and saw-dust annoy them by sticking to their foot and impeding them. A stout, coarse, horsehair line, such as is used for hanging clothes out to dry, coiled round the stems of wall fruit-trees and stretched along the wall, will operate as a protection to the fruit from both snails and slugs, in consequence of the bristly surface presented to them, and which they shrink from encountering. Care must of course be taken that they do not get under it. Watering evening and morning with strong fresh lime-water is said to have a good effect, for it penetrates about the roots of the plants and into the earth, where they lie hid. Thin slices of any vegetable of which they are more fond than of the crop to be protected will allure them, and they may be thus killed by scores early in the morning by dividing them suddenly with a sharp instrument. The dead bodies should be left on the spot as a bait, for we have seen the living slugs preying upon the exposed bowels of the dead ones, most probably attracted by the half digested vegetable matter. Ducks destroy great numbers of these pests, whilst they improve themselves, but they are apt to trample down a young and delicate crop of vegetables.

Obs.—M. Deshayes, in the last edition of Lamarck (tom. vii., 1836), remarks that the great genus of the *Limaces* is not so easy to study as might be supposed; the colour of the species is easily modified, and everything leads to the belief that they have been multiplied by those authors who have attached too great importance to these characters. M. Deshayes presumes that the European species are less numerous than some naturalists suppose. In passing from the north to the south, the *Limaces* undergo modifications similar to those undergone by other mollusks; and when we have under our eyes a series of modifications impressed upon a species which has lived under different circumstances with regard to temperature, and when we remark that these modifications are capable of being reduced to constant laws, we may believe that modifying agencies, which have acted with so much power on certain races, have had an equal effect on others; and we may foresee, by an induction not at all forced, the future results of observation on this subject. If we see, in fact, species of *Helices* modified, we may believe that similar modifications have taken place in the *Limaces*. These modifications are doubtless less easily recognised in the last-mentioned genus; for there is no solid shell by means of which they may be traced. In this state of things M. Deshayes is of opinion that the only means which science offers for the distinction of the different species of *Limaces* coming from the warm and cold regions of Europe are to be found in a minute dissection. A comparison resting on the form and disposition of certain internal organs would lead, he doubts not, to satisfactory results. Cuvier, continues M. Deshayes, in his anatomical memoir on the *Helices* and *Limaces*, has demonstrated all the analogy which exists between these two genera. Thus those zoologists whose habits of observation enable them to discover the ordinary march of nature might expect to see filled up the considerable interval, in reference to the shell, which would seem to exist between the two genera. The marine mollusks have already offered, if not in the same family, at least in the same group, a phenomenon sufficiently similar to that which is exhibited among the *Limaces* and *Helices*. In many of the *Limaces* we find no trace of a shell; in others, some calcareous grains are observed in a sac included in the thickness of the buckler, placed above the heart and *branchia*. These grains agglutinated constitute in a considerable number of species a flat calcareous plate, entirely internal; soon we find this plate coming out and showing some of its parts externally, while the remainder is still embedded in the thickness of the mantle, but its free extremity begins to be twisted spirally. This sub-internal shell, quite incapable of containing the least part of the animal, increases gradually, changes its place when the organ of respiration changes its situation, and finishes by possessing, by very insensible degrees a development sufficiently considerable to contain the entire animal, as in certain *Vitrinæ* and in all the *Helices*. Of the different degrees which exist between these two extremes of the series of these different modifications, zoologists have made so many genera.

M. Deshayes concludes his interesting observations by remarking that the history of the *Limaces* is, at the present day, become very considerable, and he finds it impossible to exhibit a complete view of it; for even the greatest brevity would lead him to overstep the limits which he necessarily imposed on himself in editing the work from which we have quoted. He refers the reader particularly to the memoirs of Cuvier for the anatomical part, and to the great work of De Férussac for the history of the genus, the distinction of the species, and the discussion of their characters.

The reader will find parts of the organization of some of the *Limaces*, and a notice of the preparations in the Royal College of Surgeons illustrating them, mentioned in the article *Helicidæ*, vol. xi., pp. 104, 105.

Since the publication of that article, the 4th volume of the 'Catalogue of the Museum of the Royal College of Surgeons' has appeared. Numbers 2297 to 2302 (Gallery), both inclusive, exhibit the generative system of the *Slugs*. Numbers 2303 to 2311, both inclusive, illustrate the same system in the *Snails* (*Helix*). No. 2315 is a specimen of the *spiculum amoris* or calcareous dart of a *Snail;* and Numbers 2846 to 2849, both inclusive, are illustrative of the *coitus* in *Helix aspersa*.

Parmacella.

Animal elongated, oblong, demi-cylindrical, covered on the middle of the back by a rounded, oblong, fleshy cuirass, which is to a great extent free in front; *head* sufficiently distinct, carrying two pairs of retractile tentacles, the one superior, long and oculiferous, the other anterior and short; *foot* large and oblong; respiratory cavity under the posterior part of the cuirass, opening, as well as the anus, by a common solution of continuity under its right border, a little backwards; orifice of generation single, near the right tentacle.

Shell flattened, calcareous, with a membranous epidermis, oval, slightly bent in the direction of its width, with a summit marked by a deep sinus on the right side posteriorly, placed in the thickness of the cuirass, above the respiratory cavity. Cuvier remarks that the shell exhibits behind a slight commencement of a spire.

M. de Blainville divides the genus into two sections: the 1st consisting of species whose tail is not carinated, and whose shell is subspiral (Example, *P. Taunaisi* and *P. Palliolum*, Fér.); the 2nd of species which are more depressed, the tail carinated and the shell scutiform (Example, *P. Olivieri*).

Geographical Distribution of the Genus.—M. de Blainville (*Malacologie*) observes that only two species are known, one from South America, the other from Persia.* Cuvier, in his 'Règne Animal,' notices the species first known, *Parmacella Olivieri*, and says that there is another from Brazil (*P. Palliolum*, Fér.), and some others from the Indies, meaning probably the East Indies. M. Rang, who remarks that the *Parmacellæ* form a very natural genus, very closely approximating to the slugs, states that in Brazil they inhabit the woods, but that at Bourbon and Madagascar he never found them except upon rocks near fresh-water torrents. He adds that Olivier brought the first specimen from Mesopotamia, and that it was this which served for the anatomical researches of Cuvier, under the name of *P. Olivieri;* that M. de Férussac has described another under the name of *P. Palliolum;* and that he (M. Rang) brought back from his voyage in the Indian Seas two others, one of which, *P. Rangianus*, has been described by M. de Férussac as an *Arion* ('Bull. des Sciences,' February, 1827); this was from the Isle of Bourbon and Madagascar.

Example, *Parmacella Olivieri*.

Locality, Mesopotamia.



Parmacella Olivieri.

M. Deshayes (2nd ed. Lam., tome vii., 1836) does not add to the single species given by Lamarck, viz. *P. Olivieri*,

* Mesopotamia?

Cuv., *P. Mesopotamiæ*, Oken; but he states that an animal coming from Brazil had been sent to M. de Férussac, and anatomized by M. de Blainville; and had been assigned by those authors to the genus *Parmacella*. This animal, according to M. Deshayes, offers nevertheless remarkable differences in the disposition of the organs of generation: but he thinks that these characters do not appear sufficient for the establishment of a genus. Since then, he adds, MM. Webb and Berthelot, who have explored the Canaries with such scrupulous attention, have observed there a mollusk closely approaching the *Parmacellæ*, and especially that from Brazil, and in their synoptic Prodromus ('Ann. des Sci. Nat.,' March, 1833) they have proposed to establish for it a genus under the name of *Cryptella*. But M. Deshayes states that he waits for the description and figure before he pronounces on its admission or rejection.

LIMB. (Astronomy.) The edge of a planet is called its limb; also the edge of any circle which forms part of an astronomical instrument.

LIMBILITE, a mineral so called by Saussure, which occurs in the volcanic hill of Limburg. It is found in irregular grains. Structure compact. Hardness 6·0 to 7·0. Scratches glass easily. Colour honey-yellow. Melts into a black enamel.

LIMBORCH, PHILIP VAN, was born at Amsterdam, the 19th of June, 1633, and was educated at the University of Utrecht. He was one of the most distinguished of the Remonstrant or Arminian theologians, whose tenets were condemned at the Synod of Dort in 1618. [DORT, SYNOD OF.] In 1657 he became pastor of the Arminian or Remonstrant church in Gouda; and in 1668 of another church of the same persuasion in Amsterdam. He was also professor of theology in the same place, in the college of the Remonstrant party. He died the 30th of April, 1712.

Limborch was a man of considerable learning; and his connection with the Arminian party, which suffered considerable persecution at that time from the Dutch government, probably led him to espouse those principles of religious liberty which distinguish most of his writings. He was on intimate terms with Locke; and carried on an extensive correspondence with him for many years. Several of his letters are printed in the third volume of Locke's Works.

The most important of Limborch's works are: 'Præstantium ac Eruditorum Virorum Epistolæ,' Amst., 1660, 1684, 1704; this volume contains the letters of Arminius and the most eminent of his followers on the distinguishing tenets of their system. 'Theologia Christiana,' 1686; 'De Veritate Religionis Christianæ, amica Collatio cum erudito Judæo,' 1687; 'Historia Inquisitionis,' 1692; 'Commentarius in Acta Apostolorum et in Epistolas ad Romanos et Hebræos,' 1661. He also edited many works of the principal Arminian theologians.

LIMBURG (Limbourg) was a province of the kingdom of the Netherlands, as constituted after the overthrow of Napoleon. It consisted of the city of Maastricht and the county of Broenhove, a part of the Dutch portion of the duchy of Limburg, the Dutch portion of the upper quarter of Gelderland, a part of the bishopric of Liege, Austrian Gelderland, parcels of Brabant, Cleves, and Juliers, the little counties of Gronsfeld and Reckheim, and the lordships of Witten, Eys, and Schlenacken, which formerly belonged to the circle of Westphalia in Germany. This province is situated between 50° 44′ and 51° 45′ N. lat., and 4° 57′ and 5° 49′ E. long. It is bounded on the north by North Brabant and Gelderland, on the east by the Prussian provinces of the Rhine, on the south by Liege, and on the west by South Brabant and Antwerp. The figure of the province grows gradually narrower from south to north till it ends in a point about two miles and a half broad; the area is about 1590 square miles, and the population (in 1838) nearly 383,000. The surface of the country is generally level, being diversified only in the south-east part by some slight elevations. The Maas is the principal and the only navigable river. In the adjoining province of Liege, the banks of the Maas are lofty and precipitous; but in the province of Limburg there are elevations only at a distance from the stream as far as Maastricht, from which place the banks are low. In the valley watered by the Maas the soil is very fertile, being covered with a rich black mould. In general the south-western part of the province, especially in the district of Maastricht, has a fertile soil, even where it consists of clay or sand; but the north-west part of this district contains extensive heaths. Of the two other districts, Hasselt and Roermonde, the only fertile portions are, in the first, the southern part between the rivers Jaar and Demer (the former belonging to the basin of the Maas, the latter to that of the Schelde), and in the second, the part along the Maas: the remaining and larger portion of these two districts is occupied by great tracts of heath and moor, where only a few cultivated spots are met with. Besides this, a large part of the great morass called Peel extends from North Brabant into the north of Limburg, and forms a desolate waste. The natural productions are corn, pulse, garden vegetables, fruit, madder, flax, tobacco, chicory; the chief mineral product is coal (150,000 tons annually), and St. Petersberg, near Maastricht, yields good stone for building; the inhabitants have the usual domestic animals, poultry, and small game. They are very industrious agriculturists, and have a good breed of cattle. There are no manufactures of importance in this province. The principal towns in the province of Limburg, besides Maastricht, the capital [MAASTRICHT], are—Bilson, on the Demer, 2800 inhabitants; Hasselt, on the Demer, a pretty well-built town, with 6500 inh., and manufactures of lace and linen; Maseyk, on the left bank of the Maas, 3400 inh.; Heerlen, 4000 inh.; Roermonde, at the junction of the Roer and the Maas, 4500 inh.; Sittard, 3400 inh.; Tongern, on the Jaar, formerly an important town, 4000 inh.; St. Tron, between Brussels and Liege, has manufactures of small-arms, lace, &c., 8000 inh.; Vaels has a great manufactory of woollen cloth, and 2500 inh.; Venloo, a strongly fortified town on the right bank of the Maas, has 5200 inh.; Weerdt, on the Bree, has great brandy distilleries, and 5500 inh.

In consequenc of the Revolution of 1830, the province of Limburg was divided between Holland and the new kingdom of Belgium. The division, as sanctioned by treaty in 1831, is stated in detail in a preceding article. [BELGIUM.] We have now only to add, that the province of Limburg, belonging to the kingdom of the Netherlands, has an area of 530 square miles, and 156,000 inhabitants: and that the Belgian province of Limburg has an area of 970 square miles and 227,000 inhabitants. Belgium however is at present in possession of nearly all the portion of the province that is assigned to Holland by the last treaty, and it is now (December, 1838) uncertain how the difference will be decided. [NETHERLANDS.]

LIME. [CALCIUM.]

LIME, Medical Properties of. Though lime exists in almost all plants, yet it is more particularly the characteristic element of animal structures, into which it is introduced with the food, as well as often by the water drank, especially when hard. A deficiency of lime in the body causes a softness of the bones to result; while an excess of it occasions preternatural induration of the bones, morbid growths from them, or exostoses, ossifications of the cartilages, of the heart and arteries, as well as depositions of calcareous concretions in various glands and cavities, such as the urinary bladder. [CALCULUS.] The action of lime on the human system varies considerably according to the state in which it is when introduced into or applied to it. Thus quick-lime is violently escharotic, causing inflammation and often decomposition of the part which it touches, and is never employed save when the actual destruction of the part is intended. In a state of great dilution, such as that of lime-water, or when rendered mild by combination with carbonic acid or phosphoric acid, it scarcely produces any immediate or direct action beyond what results from its combining with the acids of the stomach, and, if in considerable quantity, absorbing the mucous and other secretions. It likewise checks the secretions of mucous membranes with which it is not brought into contact, such as those of the bronchia. After its absorption into the system, it augments the secretion of the kidneys, and at the same time hinders the excessive formation of uric acid.

Lime-water has an effect beyond what results from its combining with any excess of acid, creating diarrhœa, for it acts as an astringent and tonic. Hence it removes a tendency to the disease, as well as cures it, when debility is the cause. Its action is often promoted by combination with aromatics, as in the aromatic confection, and occasionally with opium. Carbonate of lime in the form of prepared chalk acts in a similar way, but is accompanied with a disengagement of carbonic acid, which is sometimes beneficial, at other times distressing to the patient. [ANTACIDS;

ASTRINGENTS.] Lime-water is often the most effectual means of reconciling the stomach to a milk-diet, and is also of great service in removing the tendency to the generation of worms. [ANTHELMINTICS.] Lime-water with olive oil is a useful application to burns.

Chloride of lime appears to exercise a specific power over the lymphatic vessels and glands, increasing their activity, so that under its influence various swellings and indurations have first softened and then disappeared. This is the more remarkable as bronchocele, or enlargement of the thyroid gland, seems to be caused chiefly by drinking water abounding in calcareous salts. Chloride of lime has been strongly recommended in scrofula. It is generally given in the form of solution, but in a dry state, with extract of conium, it is even more useful.

The great tendency of chloride of lime to absorb humidity from the air renders it of much utility in preserving steel and surgical instruments from rust. Hence the presence of a portion of it in chests sent to sea protects the fine edge from erosion. For the use of the chloride (hypochlorite) of lime as a disinfecting agent see ANTISEPTICS and CHLORINE.

Phosphate of lime has been recommended in rickets and other diseases of the bones in which this earth is deficient. Its utility is increased by using at the same time phosphate of iron, or, if that cannot be obtained, the sesquioxide or rust of iron. This salt and many other salts of lime exist in different mineral waters, and some of their effects are due to this impregnation. [MINERAL WATERS.]

LIME. [MANURE.]

LIME TREE. [TILIA.]

LIMERICK, an inland county of the province of Munster, in Ireland, bounded on the north, except at the city of Limerick, by the river Shannon, which separates it from the county of Clare, on the east by the county of Tipperary, on the south by the county of Cork, and on the west by the county of Kerry. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge, it is situated between 52° 17′ and 52° 47′ N. lat., and between 8° 5′ and 9° 22′ W. long., and extends from O'Brien's Bridge on the north, to the Cork boundary at Knockea on the south, 35 statute miles, and from Abbeyfeale on the west, to the Tipperary boundary at Gaultybeg on the east, 54 miles. The area, according to the same map, is 479,580 statute acres, or 749 statute square miles, inclusive of the county of the city of Limerick. It is elsewhere estimated at 640,621 acres, of which 546,640 are cultivated, and 91,981 are unimproved bog and mountain; but this calculation is probably much more accurate in the relative proportion of arable and waste than in their united absolute extent. In 1831 the gross population was 248,201.

The general character of the surface of Limerick is that of an extended undulating plain, sloping with a gentle declivity towards the Shannon on the north, and surrounded on its southern and western borders by a well defined margin of mountain groups and hilly uplands. A mountainous tract occurs also in the north-eastern extremity of the county, between which and the mountains on the south the plain spreads eastward into Tipperary. The group on the north-east constitutes the southern extremity of that extensive chain which, commencing at Keeper mountain and its subordinate range in Tipperary and Limerick, runs northward to the King's County, where it terminates in the range of Slieve Bloom. The names of the Slieve Phelim and Bilboa mountains are applied to those subordinate portions of the Keeper group which spread southward into the counties of Limerick and Tipperary respectively, and it is by the declivities of these united ranges that the level district uniting those counties is limited on the north. The general direction of the Slieve Phelim hills is from north-east to south-west, and this is also the course pursued by the streams descending from them. These streams, falling into the Bilboa river, which runs westward along the foot of the mountains of that name out of Tipperary, form the Mulkern river. The Mulkern, increased by the Newport descending direct from Keeper, carries a good body of water to the Shannon, which it enters a little above the city of Limerick. The county between the western declivities of the Slieve Phelim hills and the Shannon is, towards the extremity of the county, flat and boggy, but has a pleasingly diversified surface along the banks of the Mulkern. The villages of Cappamore, Abington, and Annacotty are situated on this river. About midway between the embouchure of the Mulkern and O'Brien's Bridge, at the extremity of the county, is Castle Connell, a well built small town, surrounded by delightful scenery. It is built on the eastern side of the Shannon, which, flowing between well-timbered banks, chiefly occupied by demesnes and pleasure-grounds, forms a series of precipitous rapids of uncommon grandeur, the principal of which is known as the Leap of Doonass. The valley of the Shannon is here contracted by the Slieve Baughta mountains on the one side, and the range of Keeper on the other, and presents features of a highly grand and striking character throughout a distance of several miles.

The principal features of the great plain of Limerick, extending from the Mulkern westward and southward to the mountains on the borders of Kerry and Cork, are the rivers Maigue and Deel, which traverse it from south to north in nearly parallel courses. The basin of the Maigue embraces the entire eastern and south-eastern division of the county. This river has its source in the high land stretching southward to Charleville, in the county of Cork, from whence it runs a little west of north to the Shannon, and pretty nearly bisects the central plain of Limerick. Its chief feeders have their sources among the mountains which occupy the south-eastern division of the county. These consist of a continuation of the great Gaultee range, and of a detached group called the Castle Oliver mountains, rising at a short distance from its western extremity. The Looba, formed by the streams descending from the northern and north-western declivities of the latter, runs westward from Kilfinnan by the decayed town of Kilmallock through a rich grazing country, and joins the Maigue near its source. The Star river, rising near Galbally, in the interval between the Gaultee and Castle-Oliver mountains, traverses a similar vein of deep pasture and tillage lands in a north-western course through Bruff, and joins the Maigue about five miles from its junction with the Looba. The Camogue, the most considerable stream of the three, rises on the borders of Tipperary in the open country skirting the northern declivities of the Gaultees, and runs nearly parallel to the Star, at an average distance of about five miles, by Hospital and Six-mile-Bridge, to a mile above Croom, where it meets the Maigue, which, five miles below the point, becomes navigable at Adare. From Adare to the Shannon is a distance of twelve miles of navigable river. The only striking feature of the plain watered by the above tributaries of the Maigue is Loch Gur, a picturesque sheet of water three-quarters of a mile in length, embosomed among romantic knolls, some of which have a considerable elevation, about midway between Six-mile-Bridge and Bruff. A cave and the ruins of a strong fortress on an island in the lake add to the interest of the scene. From the summit of Knockfennel, one of the hills forming the basin of the lake, a magnificent view is obtained of the surrounding plain, comprising the greatest extent of arable land unencumbered with bog in Ireland, bounded by an imposing amphitheatre of distant mountains. The country north of the Camogue, between it and the Mulkern and Shannon, have a more varied surface than that above described. The conical hills of Kilteely and Knockdirk, Pallas Hill, and the hill of Knockrua, rise within a short distance of one another on the Tipperary border, about midway between the more marked mountain boundaries which limit the plain on the north and south Several minor heights rise throughout the plain immediately south of the liberties of Limerick, which lie along the Shannon. The small town of Pallasgrean is situated on the Tipperary side of this district, Caherconlish about its centre, and Patrick's-well, towards the Maigue, on the road from the city of Limerick to Adare.

The county west of the Maigue for about two-thirds of its extent has much the same character of surface as the district last described, the remainder being included in the mountainous region stretching westward into Kerry. It is watered by the Deel, a river of nearly equal size with the Maigue, and also navigable for three miles above the Shannon, into which it falls below Askeaton. The lower portion of the courses both of the Deel and Maigue is through so flat a country that their respective valleys are scarcely observable, but in the district intervening between their sources there is a good deal of high ground, particularly about the small town of Ballingarry, in the neighbourhood of which are the steep hills of Knockfeerruha and Kilmoody; the former of which has an elevation of 907 feet.

The valley of the upper Deel lies between these heights on the east, and the high country towards Kerry on the west, which latter rises round this margin of the level district in a continuous sweep of upwards of twenty miles in compass from Drumcullagher, at the head of the river, to Shanagolden and the Shannon. The town of Newcastle is situated on the south-western border of the plain between the river and these mountains; and lower down upon the Deel, on the road from Adare to Newcastle, is Rathkeale, the most considerable place, next to the city of Limerick, in the county. At the northern extremity of the mountain-range the detached hill of Knockpatrick rises boldly between the town of Shanagolden and the Shannon. From Shanagolden westward the surface is rough and hilly, rising at the distance of two or three miles from the Shannon into sterile tracts of bog and mountain, which spread southward and westward into the counties of Cork and Kerry, forming altogether a mountainous area of 900 square miles. The village of Glin is situated on the shore of the Shannon under the northern termination of these highlands, in the north-western extremity of the county. The mountains which rise in a continuous ridge towards the valley of the Deel are backed by other groups running east and west, the valleys formed by which are traversed by various streams, which join the Geale and Feale rivers, running westward into Kerry. On the Feale, at its junction with the Ulahane, which descends from one of these glens, is situated the town of Abbeyfeale, in the extreme south-west of the county, and nearly in the centre of the mountainous region above mentioned.

Although the Shannon does not lose the character of a river until after passing beyond the bounds of this county, yet for all the purposes of commerce it is equivalent to an equal length of sea-coast from Glin to Limerick, a distance, including the windings of the river, of about 35 miles. With the exception of a few points, which may be improved at a small expense, the navigable channels of this part of the river are capable of admitting vessels of heavy burthen as far as the pool of Limerick, situated about two miles below the city. At present there is a great deficiency of beacons, buoys, and marks to guide vessels in these channels, and there are no suitable piers or landing-wharfs along the shore. Several such works are however contemplated by the present commission for the improvement of the Shannon, including piers at Glin and Kilteery, of an estimated cost of 5879*l.* and 1836*l.* respectively, and quays at Foynes and Askeaton, the estimated cost of the latter being 900*l.* It is also proposed to widen and deepen the channel of the Maigue, as well as the old branch canal and basin connecting that river with the town of Adare, so as to form an inland navigation for vessels of considerable draught, of 12 miles from the Shannon. [SHANNON.]

The leading lines of road diverging from Limerick to Clonmel, Cork, and Tralee are carried nearly in straight lines over the open country. The two latter lines pass through the principal places in the county, the Cork road running by Bruff and Killmallock, and that to Tralee by Patrick's-well, Adare, Rathkeale, Newcastle, and Abbeyfeale. A new road by Croom to Charleville, and thence to Cork, is in progress. The opening of several new roads by government in 1829, through the mountainous district surrounding Abbeyfeale, has had the best effect in promoting peaceful and industrious habits among the population of that portion of the counties of Limerick, Cork, and Kerry.

A line of railroad from Dublin through Limerick, along the southern bank of the Shannon, to Tarbert in Kerry, has been recommended by the commissioners appointed to consider and recommend a general system of railways for Ireland.

The climate is remarkably good, and the least variable of that of any of the western counties of Ireland. Instances of longevity are very numerous.

Geology.—The level part of the county consists of the carboniferous limestone of the central plain of Ireland. The mountain groups and detached eminences of its eastern and southern margins are formed by the protrusion of older rocks, and the high lands on the west consist of more recent series superimposed. The Slieve Phelim and Bilboa groups, in common with the extensive range of which they form a part, consist of a nucleus of clay-slate supporting flanks of yellow sandstone and conglomerate disposed in conformable beds. Towards the south-western extremity of the Slieve Phelim group the yellow sandstone disappears and the clay-slate is bordered by a tract of old red sandstone. Old red sandstone also forms the nucleus of the Slievenamuck chain, an offset of the Gaultees, the western declivities of which spread into Limerick above Galbally. The clay-slate reappears in the central summits of the Gaultees and Castle Oliver mountains, flanked by old conglomerate with red, purple, and green clay-slate, sustaining a margin of yellow sandstone. Old red and green sandstone, the latter supported by the former, compose the various protrusions which rise between and in the valleys of the Upper Maigue and Deel rivers, except in Knockfeernha hill, where a mass of crystalline greenstone trap supplies the place of the more general nucleus. Trap protrusions occur in twelve distinct localities in the eastern part of the county, between the embouchure of the Maigue and the border of Tipperary. Of these the most striking are the hills of Pallas, Kilteely, and Knockdirk. The interstratification of the floetz limestone and trap rocks is here well marked, both on the large and on the small scale, the open country exhibiting numerous parallel ridges of low elevation, caused by the successive outcrops of massy beds of trap and limestone in alternation with each other, and the escarpments of the hills exposing the subordinate divisions that arise from the interposition of thinner strata of limestone in the igneous rock. The general structure of these greenstone protrusions resembles that of the hill of Croghan [KING'S COUNTY], particularly in the case of Pallas hill, which is, like Croghan, remarkable for the great fertility of its soil. Pallas hill is further distinguished by the presence of columnar basalt, which overlies the amorphous trap of its northern brow. A façade of about sixty yards in length by seventy to eighty feet in height has been exposed by quarrying. The columns incline towards the north at an angle of 75°, and are of irregular figures, chiefly disposed to the pentagonal and hexagonal forms. There are two clusters of such pillars. On the west of the hill is an outcrop of red iron claystone. Felspar porphyry occurs in various forms throughout the hills of Knockdirk, Kilteely, and Knockrua. The mountainous district on the west of the county belongs to the great Munster coal-tract, which is probably the most extensive in the British islands. The coal occurs in troughs, as in the Killanaule district. [KILKENNY.] Six distinct beds have been observed; but the coal is usually of a slaty structure, and much softer than that of Tipperary or Kilkenny: it is chiefly used for burning lime. Owing to the undulating character of the surface and the consequent magnitude of the angle (usually from 60° to 70°) which the beds make with the horizon, the mining operations are conducted upon the same system as those of the metallic veins. The only workings within Limerick have been at Newcastle and Loughill, in the north-western extremity of the county, where the shale and sandstone repose immediately on the upper or splintery limestone. The latter is the surface-rock throughout the rough tract west of Shanagolden, between the Shannon and the bolder acclivities of the highland country. About seven miles from the city of Limerick, near the Askeaton road, is a quarry producing a fine maroon-coloured marble, which can be raised in blocks of any size, and to an unlimited extent; and in the more immediate vicinity of the city black marble, but of an inferior quality, is got in abundance, and generally used as a building-stone.

Iron, copper, and lead ores are found in various localities throughout the district occupied by the trap protrusions, but no veins are at present worked.

Soil and Agriculture.—A tract of extraordinary fertility, called the Golden Vein, stretching westward out of the county of Tipperary, occupies the greater part of the eastern plain of Limerick. It extends from the sources of the Maigue to the Mulkern, and has an area of about 160,000 statute acres. The soil is a rich, mellow, crumbling loam, and is equally suited to grazing or tillage: it is chiefly in pasture. One acre is considered sufficient to fatten the largest bullock and a sheep. A still richer soil is that of the 'Corcasses,' which extend for fifteen miles along the southern bank of the Shannon, from a little below Limerick to the embouchure of the Deel. They are similar in character to those of the opposite side of the river [CLARE], having a soil of yellow or blue clay, covered with a deep rich black mould. They yield the greatest wheat crops raised in Ireland; and their produce of potatoes sometimes amounts to one hundred barrels of twenty-two stone each

to the Irish acre. The soil of the remainder of the limestone plain is light and sweet, very good for tillage, and yielding an excellent pasture for dairy cattle and sheep. Not more than one-fourth of the level district is however under tillage. Pasture and dairy farming are the staple occupations of the people. The store-farmers are comparatively a wealthy class, and frequently have stocks of from 400 to 600 head of cattle; they usually purchase at Ballinasloe, and sell at the fairs throughout the county, which are regularly attended by Cork buyers. The sale of stock in Limerick city has latterly been inconsiderable. Great quantities of butter are made throughout the county. Limerick is the chief point of exportation, but considerable quantities find their way to Cork from the extreme south and south-west. The butter of Limerick ranks above that of Cork in the London market, but does not in general bring so high a price as the butters of Belfast and Carlow. The making of cheese is not attended to. Pigs of a very superior description are bred in great numbers by the dairy farmers. An excellent cider is made in the districts about Rathkeale, Adare, Croom, and in some other localities. The apple which produces the most esteemed liquor is called the Cackagee. The following table shows the sales of grain in the years 1826 and 1835:—

	Barrels of Wheat, of 20 Stone.		Barrels of Oats, of 14 Stone.		Barrels of Barley, of 19 Stone.	
	1826.	1835.	1826.	1835.	1826.	1835.
City of Limerick	51,555	132,608	290,957	321,326	13,533	36,953
Kilfinnan . .			4,28)	4,285		
Newcastle .	20	25	1,542	1,607	250	281
Rathkeale .	4,515	8,960	1,647	1,931	875	243
Shanagolden .	1,460	2 437				
Kilmallock .	2,409	6,122				
Cahirass . .	10,751	20,750				
Bruff . .	922					
Greenville .			7,000	8,342		
Askeaton .	3,500	7,820				

There are no returns for Glin and Croom, and those for Askeaton are deficient.

There is a small manufacture of coarse woollens for home consumption, and the bleaching of linen is carried on, but on a contracted scale. There are three paper-mills, and large and powerful mills for the grinding of corn at Cahirass, Askeaton, Corbally, Croom, Rathkeale, Kilmallock, and Greenville. In 1831 there were in the county, exclusive of the county of the city, 25 flax-dressers, 36 millers, 5 paper-makers, 15 tanners, 9 tobacconists, 1146 weavers, and 11 wool-combers.

The condition of the peasantry is better in the grazing than in the tillage districts. The subdivision of farms and the system of con-acre have contributed, in some localities in the south-east and north of the county, to reduce the labouring population to a very low standard of subsistence. The average wages of agricultural labourers are, in winter, eightpence, and during the rest of the year tenpence per day, for 140 working days in the year.

There is a numerous resident proprietary, whose seats and demesnes afford a pleasing contrast to the generally bare aspect of the county; for, except about the residences of the upper classes, timber is very scarce. The number of large absentee proprietors is however very considerable, and they do not in general keep up establishments within the county. Among the residents are many gentlemen farmers who practise the most approved systems of green-cropping and stall-feeding. Their example has of late years led to a marked improvement in agriculture, as well as in the breed and quality of stock.

Limerick is divided into the baronies of *Owneybeg* on the north-east, containing the village of Murroe, population (in 1831) 256; *Clanwilliam*, south of Owneybeg, containing the town of Cahirconlish (pop. 703); *Coonagh*, south-east of ditto, containing the village of Pallasgrean (pop. 379); *Small County*, south of the two latter, containing the town of Hospital (pop. 1131); *Coshma*, south of Small County, containing the towns of Bruff (pop. 1772), Croom (pop. 1268), and Adare (pop. 766); *Coshlea*, in the south-eastern extremity of the county, containing the towns of Kilfinnan (pop. 1752) and Galbally (pop. 560); *Pubblebrien*, on the west of Clanwilliam, containing the town of Patrick's-well (pop. 512); *Kenry*, west of Pubblebrien, containing the town of Pallaskenry (pop. 630); *Lower Connello*, containing the towns of Rathkeale (pop. 4972), Askeaton (pop. 1515), Glin (pop. 1030), and Shanagolden (pop. 847); and the villages of Ardagh (pop. 415), Loughill (pop. 277), and Croagh (pop. 274); and *Upper Connello*, containing the towns of Newcastle (pop. 2908), Ballingarry (pop. 1685), Drumcullagher (pop. 658), and Abbeyfeale (pop. 607); and the villages of Bruree (pop. 451) and Knockaderry (pop. 351). Besides these the county contains the liberty of Kilmallock, including the town of Kilmallock (pop. 1213).

Kilmallock is an antient disfranchised borough which possessed a charter in the reign of Edward III., and appears to have existed as a corporation long prior to that time. Its latest charter bears date the 10th of January, 27 Eliz. The corporation is now virtually extinct. The town, during the 15th and 16th centuries, was a place of very considerable importance. Its walls included a spacious quadrangular area with gate-towers in each front and a strong castle in the centre. The houses of the nobility and gentry of the county, many of whom resided here, were built in the castellated style, and constituted separate fortalices. In addition to these there were numerous religious edifices of a corresponding character. The place having been repeatedly besieged during the various civil wars of which the Desmond territory was the theatre, was finally dismantled at the close of the war of the Revolution of 1688. One only of the gate-towers is now standing, with part of the old wall, and the remains of the castle in the centre of the town. The castles and mansions of the former residents are, with the exception of two, in ruins; so also are the religious houses; and a few years since, the only inhabited dwellings in this formerly flourishing place were mud cabins or portions of the ruined edifices thatched in. It has however latterly revived, and there are at present some good houses and shops in the main street. There are several handsome residences in the vicinity, the principal of which is a seat of the Coote family.

Askeaton was incorporated by charter of the 11 James I., but the corporation is now extinct, and the borough disfranchised. The earl of Desmond had a strong castle here, the remains of which still overhang the river at the east end of the bridge. It was besieged and taken by Sir George Carew in 1579, and again by Lord Broghill's forces in the war of 1642. Vessels of 60 tons burthen come up to the town, which has an increasing trade in grain and the manufacture of flour and oatmeal. A rapid on the Deel above the town affords a good water-power and salmon-fishery.

Rathkeale is not incorporated, but is a place of brisk traffic. A colony of German Protestants planted in the neighbourhood by the family of Southwell has contributed in a great measure to the prosperity of the town. Castle Matras, the seat of the Southwell family, erected in the reign of Queen Elizabeth, is the principal mansion in the vicinity. The farms of the 'Palatines,' as the German settlers are called, exhibit a pleasing contract to the slovenly appearance of small Irish farms in general. They are usually distinguished by an orchard and garden attached to the dwelling-house.

Adare on the Maigue is not a place of much importance; but it is situated in the midst of a highly improved district, and possesses great interest for the historian from the number and preservation of its ruined religious houses. Adare Castle, the seat of the earl of Dunraven, is situated on the west bank of the river close to the town. The mansion is in the later English style, and when completed will be one of the most splendid in the south of Ireland. Between Askeaton and Adare is Curragh, the residence of Sir Aubrey de Vere, Bart. The demesne is extensive, and possesses a great variety of beautiful scenery. The house is a fine pile of building, 116 feet by 72 feet. Rockbarton, the seat of Lord Guillamore, and Killballyowen, another residence of the O'Grady family, are in the neighbourhood of Bruff, the former finely situated about a mile to the west of Loch Gur. The principal seats along the Shannon, including those within the county of the city of Limerick, are Mount Shannon, the residence of the earl of Clare; Roxborough, that of Lord Gort; Clarina Park, of Lord Clarina; Hermitage, of Lord Massey, and Shannon Grove, of the earl of Charleville, all in the immediate neighbourhood of Limerick; Tervoe, the residence of the Maunsell family, and Castletown, of the family of Waller, between Limerick and the

river Deel; and Mount Trenchard, near Shanagolden, the seat of Mr. Spring Rice.

Prior to the Union, the county of Limerick returned six members to the Irish parliament; two for each of the borough towns of Askeaton and Kilmallock, and two for the county. It is now represented in the imperial parliament by two county members only. At the close of the year 1835 the constituency was composed of 2891 electors. The assizes for the county are held at the city of Limerick, where are the county gaol and courthouse. Quarter-sessions are held at Limerick, Rathkeale, Newcastle, and Bruff, where there are courthouses and bridewells. There are bridewells also at Croom, Glin, and Kilfinnan. The police force of the county on the 1st of January, 1836, consisted of two chief constables of the first class, four of the second class, twenty-five constables, 144 subconstables, and six horse of the constabulary force; the cost of which establishment for the year 1835 was 8957*l.* 6*s.* 2*d.*, of which 3624*l.* 17*s.* 4*d.*, was chargeable against the county. At the same time there were in the county and city of Limerick one magistrate, twenty-four constables, and ninety-nine subconstables of the peace preservation police, the cost of which establishment for the year 1835 was 6,444*l.* 15*s.* 10*d.* The total number of persons charged with criminal offences who were committed to the county gaol during the year 1836 was 803, of whom 728 were males and 75 females. Of these, 161 males could read and write at the time of their committal, 114 males and two females could read only, and 458 males and 73 females could neither read nor write. The district lunatic asylum for the counties of Limerick, Cork, and Kerry is at the city of Limerick, where are also the county infirmary and fever hospital. There are four other fever hospitals and twenty-four dispensaries throughout the county.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	23,848	..	..	..	..	..	..	130,000
1821	Under Act 55 Geo. III., c. 120	35,201	38,746	..	..	..	108,799	109,633	218,432
1831	Under Act 1 Will. IV., c. 19 .	36,981	40,894	31,236	5,186	4,472	123,211	125,590	248,801

Prior to the arrival of the English, Limerick constituted part of the petty kingdom of Thomond, or North Munster. Donald O'Brien was prince of this territory at the time of the English invasion, and at first united with Roderick O'Connor, whom he attended to the siege of Dublin in resisting the English. Being married however to a daughter of Dermod MacMurrogh, he soon after consented to receive the assistance of his father-in-law's allies in carrying on a feud which had long subsisted between him and Donald, prince of Ossory, and on the arrival of King Henry II., A.D. 1172, he was among the first to tender his homage and receive an English garrison into his city. But he did not long continue loyal, and in 1176 it was found necessary to send Raymond le Gros with a large army to recover from him the city of Limerick, which he had wrested from its new occupiers. In the next year he got the city again into his hands on pretence of a peace, but again revolted, and his territory being thus fortified, King Henry bestowed all Limerick, excepting the city and the cantred adjoining, on the brothers and nephew of Richard, earl of Cornwall. But they, being unable to get possession, in a short time surrendered their unprofitable grant. The king then, A.D. 1179, bestowed it on Philip de Braosa, at a rent of sixty knight's fees. Braosa had no better fortune than the first grantees, and Donald continued in possession till his death in A.D. 1194. In 1199 King John renewed his father's grants to the De Braosa family, and bestowed a part of the reserved territory on William de Burg, to whom he committed the custody of the city. William de Braosa having fallen under the king's displeasure, and fled to Scotland, was attainted, and his lands again reverted to the crown. A portion of the forfeited lands, comprising the barony of Owneybeg, was then conferred on Theobald FitzWalter, the ancestor of the Ormonde family, and other portions on Hamo de Valois, William FitzAdelm de Burgho, and Thomas, son of Maurice Fitzgerald, the ancestor of the great family of Desmond. These new settlers brought in a colony of English, chiefly from Bristol and Chester, who took up their residence chiefly in the city and towns near the river. The growth of the family of Desmond has been referred to in preceding parts of this work. [CORK; KERRY.] Maurice Fitzgerald, earl of Desmond, in the beginning of the reign of Edward III., had become possessed of a great [illegible] of the counties of Limerick, Kerry, Cork, and Waterford, from which he derived a revenue of 10,000*l.* per annum, a vast income in those days. His pride and turbulence led to several invasions of his territory by the king's forces, and to his own imprisonment on two occasions. Thomas, another earl of Desmond, who lived in the reign of Edward IV., and whose unrestrained authority and Irish habits had led him into frequent collisions with the government, was attainted of treason at Drogheda, A.D. 1468, and there executed. His son was however restored to the title and estates, which continued in this family until their final forfeiture by Gerald, the sixteenth earl, in 1586. [KERRY.] The estates of this unfortunate nobleman in the county of Limerick alone consisted of 96,165 acres, which were granted among the following twelve individuals: Sir Henry Billingsley, William Carter, Edward Mannering, William Trenchard, Sir George Bourchier, Sir George Thornton, Richard Fitton, Robert Annesley, Edward Barkley, Sir Henry Uthered, Sir William Courtenay, and Robert Strowde, most of which names are now extinct in the county. The war which ensued throughout Munster forms the subject of an interesting historical work entitled 'Pacata Hibernia,' attributed to Sir George Carew, afterwards earl of Totness, in which the reduction of the various strongholds of the insurgents in Limerick, including the castles of Loch Gur, Croom, Glin, &c., is minutely detailed. On the breaking out of the rebellion of 1641, the city of Limerick and all the chief castles of the county, with the exception of Loch Gur and Askeaton, which latter now belonged to the earl of Cork, fell an easy prey to the insurgents, in whose hands they for the most part continued until the capture of Limerick by the parliamentary forces under Ireton in 1651. The forfeitures which ensued embraced almost the entire county, and introduced a numerous new proprietary. The events which followed on the accession of King James II. are detailed under the head of the city of Limerick. The war of the Revolution terminated in further forfeitures comprising 14,188 acres, of a total estimated value of 61,470*l.* 10*s.* The families of Fitzgerald, Rice, Trant, and Brown were the principal sufferers. From this time until the latter end of the last century the county continued undisturbed. A spirit of insubordination among the peasantry, arising, it is said, from the severe exaction of rack-rents, broke out in insurrectionary acts in 1762, and again in 1786 and 1793. These at the time were suppressed, and many of the ringleaders executed. The rebellion of 1798 did not affect the county; but the spirit of agrarian disturbance still continued. In 1815, 1817, and finally in 1821-2, the peasantry rose in arms and committed the most atrocious outrages. After several conflicts with the king's troops, and the loss of much life on both sides, the insurrection was at length put down by the energy of the magistracy, assisted by a special commission. Great numbers of the offenders were executed or transported, and a failure of the crops in 1823, added to the rigour of summary justice, completely broke the spirit of the insurgents. The construction of new roads, by which the mountain districts were rendered accessible, in 1829, contributed materially to the permanence of the tranquillity so produced, and since that time Limerick has remained undisturbed and comparatively prosperous.

Limerick is among the richest of the Irish counties in antiquities. There are extensive Cyclopean remains on the hill of Knockfennell near Loch Gur. The fort on the western pinnacle of the hill is a circle of 360 feet in circumference, with a wall ten feet thick composed of massive blocks of dry stone. Walls of a similar construction extend on one side to a morass, and on the other to a smaller fort which occupies the eastern point of the hill. Other Cyclopean buildings are situated on a rocky height to the east of the lake. Military earthen works are numerous in all parts of the county. The largest raths are those at Bruree, Kilpeacon, Pallasgrean, and Kilfinnan. At Carrigeen near Croom are the remains of a round tower still fifty feet in height. For the first sixteen feet from the base it is composed of solid masonry. Another round tower at Ardpatrick in the south-east of the county was standing until recently. There was a third in the city of Limerick, of which there are now no remains. The ruins of religious houses are very numerous. Adare, Kilmallock, and Askeaton are peculiarly interesting from the number and extent of their ecclesiastical remains. The river Camaigue alone has the ruins of seven religious houses on its banks. Manister-Nenagh, the most considerable of these, is the most extensive pile of monastic ruins in Munster. It was founded by O'Brien, king of Limerick, in A.D. 1148. The entire number of such foundations in the county was about thirty-five, chiefly erected by members of the house of Desmond. Of the castles of the early proprietors nearly one hundred still remain. Of these the most remarkable are Croom Castle on the Maigue, from which the Fitzgerald family take their their motto of *Croom aboo*, and Shanet Castle near Shanagolden, from which the Desmond branch of the same house took their motto and war-cry of *Shanet aboo*. The walls of the latter are ten feet thick. Cappa Castle, near Askeaton, was another seat of the Fitzgeralds. Part of the keep, 100 feet high, is still standing. It is remarkable for the superior style in which it is built, the quoin-stones being polished. At Castle Connel are the ruins of a noble castle, once a seat of the O'Briens, which was dismantled by General Ginkle in 1691. Carrickagonniel Castle, another stronghold of the O'Briens, is boldly situated on a basaltic rock rising suddenly from the plain to a height of several hundred feet over the southern bank of the Shannon. It was blown up by General Scravenmore in the war of the Revolution; but, although 84 barrels of gunpowder were exploded under it, two of the towers are still tolerably perfect. There are several stone circles, and other supposed remains of Druidical worship throughout the county.

The county lies chiefly within the diocese of Limerick, and embraces small portions of the dioceses of Emly and Killaloe, from the returns under which articles a judgment may be formed of its educational statistics.

The amount of grand-jury assessment for the year 1835 was 32,088*l.* 5*s.* 3*d.*, of which 16,651*l.* 2*s.* 7*d.* was for public establishments, salaries, &c, and the remainder for the construction of roads, &c., and for the maintenance of the police.

(Fitzgerald and M'Gregor's *History of Limerick*, Dublin, 1826; *Transactions of the Geological Society*, v. 5; *Report of the Irish Railway Commissioners*, 1838; Cox's *History of Ireland*; *Parliamentary Reports and Papers*.)

LIMERICK, a city and county of a city in the province of Munster in Ireland. The county of the city, exclusive of the site of the town, comprises an area of 16,468 Irish acres, equal to 26,650 statute acres, of which the north liberties, consisting of 1714 acres, lie north of the Shannon, on the county Clare side, and the south liberties, consisting of 14,754 acres, lie south of the river, encompassed by the county of Limerick. The city, which is chiefly built on the county Limerick side of the river and on an island, is situated in 52° 40′ N. lat. and 8° 35′ W. long., and is distant from Dublin 93 Irish or 118 statute miles. The population of the county of the city in 1831 was 66,554, of which number 44,100 were in the city and suburbs.

The island on which the old town of Limerick stands was probably selected as the site of a city from the circumstance of this being the first point at which the Shannon is fordable above its embouchure. The island, called King's Island, is about a statute mile in length, by from a quarter to half a mile in breadth, and lies nearly north and south, having the main stream of the Shannon, about 500 feet in width, on the western side, and a smaller branch, called the Abbey river, of an average breadth of 200 feet, on the east and south.

The antient city of Limerick is by some supposed to be the Regia of Ptolemy. It certainly was a place of some note in the fifth century when visited by Patrick. From that time until the arrival of the Danes little is known of its history. The Danes made their first attempt on Limerick in the year 812; and, although repeatedly baffled, succeeded about the middle of that century in getting possession of the place. They appear to have been an enterprising and trading people, and to them the first effectual fortification of the island of Limerick is attributed. Towards the close of the tenth century, they were reduced by the celebrated Brian Boroimhe, and rendered tributary to the kings of Munster. The effectual introduction of English government did not take place till after the death of Donald O'Brien, who was their king at the time of the invasion by Henry II. of England. [LIMERICK, County.] The first provost under the new administration was appointed A.D. 1195. King John coming to Ireland in 1210, visited Limerick among other places, and caused Thomond Bridge, which up to the last year (1838) was still standing, to be erected over the Shannon. He also had the castle of Limerick built, and established a mint in the city, to which he granted large privileges by a charter of the 2nd year of his reign. Great numbers of English settlers now arrived, and the city continued to prosper until the invasion of Ireland by Edward Bruce, who burned the suburbs in 1314, and during the winter of 1316 made Limerick the rendezvous for his Irish allies. On the termination of this war the citizens obtained a grant of murage for the further strengthening of their fortifications. The suburb of Irishtown, which had now grown up on the southern bank of the Shannon, was partly walled in, and in 1495 its fortifications were completed by the erection of St. John's Gate. A tholsel, or town-house, was erected in 1449, and in 1500 a vaulted pier, which served both as a quay and a battery, was built. Throughout the disturbances caused by the rebellions of the earls of Desmond and the other turbulent Irish potentates in the reigns of Henry VII., Henry VIII., and Elizabeth, the citizens of Limerick remained strictly loyal.

At this time the town appears, from various maps remaining, to have been remarkably well built. In addition to King John's castle, commanding the bridge into Clare, there were twenty-four towers at the several angles of the wall which surrounded Englishtown, or that part of the city which was built on the island. Dromcore Castle, in the centre of Irishtown, consisted of twelve towers connected by high walls and surrounded by a fosse and outworks, and there were towers defending the several gates in the wall which encompassed this entire suburb. The separation of the county of the city from the surrounding country took place under the provisions of a charter granted by King James I., A.D. 1609. Early in the war which succeeded the Rebellion of 1641, Limerick was seized by the Roman Catholic party under Lords Muskerry and Ikerrin, and in 1643 they considerably strengthened the fortifications of Irishtown by the erection of towers and ramparts inside John's Gate. The supreme council of the Roman Catholics having removed hither in 1646, Limerick became the scene of various commotions and outrages produced by the bigotry of those who adhered to the extreme measures of the Nuncio Rinuncini. General Ireton, at the head of the parliamentarian army, appeared before the city in April, 1651. The garrison was commanded by General O'Neil, whose defence of Clonmel had already gained him much reputation, and who fully sustained his character for skill and courage during a severe siege of nearly six months. On the surrender of the city, several leading persons of the Roman Catholic party, including the titular bishop of Emly and a friar Woulfe, who had been excepted out of the terms of capitulation, were executed. Tranquillity being restored by the re-establishment of English government, a considerable influx of Protestant settlers took place; but the accession of King James II., and the consequent discountenance of those of the Reformed faith in Ireland, deprived them of their influence in the city and caused great numbers to return to England. Immediately after the battle of the Boyne and the flight of James, King William advanced against Limerick, now strongly garrisoned by the flower of the Irish army, under the duke of Berwick and General Sarsfield. He arrived at Cahirconlish on the 7th August, 1690, and, after some skirmishing, opened his fire on the citadel on the 9th. Sarsfield having intercepted and destroyed the heavy artillery which was on its way from

Cashel, prevented the construction of an effective battery until the 17th. A practicable breach having been effected between John's Gate and the Black Battery, on the 26th, the assault was made the following day.

The besiegers twice gained the counterscarp, and were twice driven back: at the third attempt a considerable body of troops forced their way into the town. One division of these was disorganized, and to a great extent destroyed, by the explosion of a mine under the Black Battery, which they had scaled. The other division was assailed with amazing fury by a mixed crowd of soldiers, citizens, and women, and was almost to a man exterminated. The besiegers, after a loss of 1700 men killed and wounded, were forced to return to their trenches; and on the 30th of August dismantled their batteries and retired towards Clonmel. In the early part of the next year Athlone was carried by the Protestant army, and the decisive victory at Aughrim soon after compelled St. Ruth, who commanded the Irish, to draw again towards Limerick as the last tenable position which was now left him in Ireland. On the 25th of August, 1691, General Ginkle invested the town on the south side of the river; and on the 30th opened his batteries. The fire against the English town was directed from a battery of ten field-pieces for hot shot on the left, another of twenty-five heavy battering cannon on the right, and eight mortars in the centre. A fort, which had been captured early in the siege, and another battery on the south-west, cannonaded the Irish town. On the 15th of September a force was detached by a pontoon-bridge across the Shannon, to cut off the communication with the county of Clare, which being effected, and the works of the besiegers everywhere pushed close to the walls, provisions failing, and the expected succours from France not having arrived, the garrison on the 23rd of September proposed an armistice. Negotiations were now opened, which terminated, on the 3rd of October, in the signature of the celebrated treaty of Limerick, by which it was agreed that in consideration of the surrender of the place the Roman Catholics should enjoy the same privileges which they had in the reign of Charles II. The garrison were allowed to march out with arms, baggage, and colours flying, and either to embark for France, or enter the king's service, at their option. Of 14,000 men so circumstanced, about 11,000 went on board the French fleet, which, two days after the execution of the treaty, arrived off the coast. These formed the nucleus of the Irish brigade, which was afterwards so celebrated on the Continent.

The city now began slowly to recover from the effects of these repeated disasters. In 1696 lamps were put up in the public streets at the expense of the mayor. In the following year the castle in the Irish town was thrown down, and a market-house erected on its site; and in 1717 the Abbey river was partly quayed in. About 1760, besides several new roads, a canal was commenced, by which the Shannon was rendered navigable to Killaloe. A sum of 19,500*l.* was granted towards this work by the Irish parliament, and in 1768 the works were committed to a company of undertakers, who subscribed a further sum of 10,000*l.* At the same time the old walls began to be taken down to make room for the increase of the city. The communication between Englishtown and Irishtown had hitherto been by one narrow bridge encumbered with a row of houses. In 1761 a commodious bridge was erected between Englishtown and the southern bank of the main river, close to the latter. The new custom-house was next built on the south side of the main river, near the new bridge. In 1766 a further portion of the south side of the Abbey river was quayed in. In 1796 the buildings of the Irish town began to extend along the southern bank of the main river, on an open elevated plot of ground called South Prior's Land, or Newtown-Pery. This division now constitutes the best part of Limerick, and is justly considered one of the most elegant towns in Ireland.

The corporation is governed by several acts and charters, but chiefly by act of 4 Geo. IV., c. 126. The governing body consists of the mayor, two sheriffs, and an indefinite number of aldermen and burgesses elected by the common-council. The freedom is acquired by birth, marriage, apprenticeship, and the election of the common-council. The recorder is elected annually by the same body. The acts of the council are controlled by the freemen's court of D'Oyer Hundred, which is held four times a year. The president of this court is the common speaker, who is elected every two years by the freemen. The criminal jurisdiction of the corporate authorities includes all offences, and is exclusive, the city being a county in itself. The civil jurisdiction of the recorder's court extends to all personal actions to an unlimited amount. The revenue of the corporation, arising chiefly from tolls, amounted in 1833 to 4418*l.* 16*s.* 8*d.*, but is variable. Their annual average expenditure, exclusive of payments in reduction of debt, is 3000*l.*

Prior to the Union Limerick was represented in the Irish parliament by two members; the representation was then limited to one; but recently, by act 2 Wm. IV., c. 88, the old representation has been restored. By this act the franchise is extended to householders and leaseholders, and the non-resident freemen are disfranchised. In 1837 the number of electors was 3186, of whom 280 were freemen. The assizes for the county of the city are held twice a year before the mayor and the going judges. The assistant barrister for the county sits twice a year for the trial of civil bills. The recorder's court and the court of conscience sit once a week, and there are also petty sessions twice a week. The police force of the city is included in that of the county. In 1826 there were committed to the city gaol of Limerick 981 males and 291 females charged with criminal offences. Of these 532 males and 41 females could read and write at the time of their committal, 60 males and 31 females could read only, and 389 males and 219 females could neither read nor write.

Newtown-Pery now forms by much the most important portion of the city. Englishtown has been deserted by the wealthier classes, and is daily decaying; and Irishtown, although better built and inhabited, wants the frontage to the main river, which gives the new town its great advantages. There is a considerable suburb on the county Clare side, round the old castle of Thomond, which defended that end of King John's bridge. The streets of Englishtown are narrow and irregular, but it still contains several important buildings. St. Mary's cathedral occupies an open space about the centre of this division of the city. It is a venerable cruciform structure, measuring 156 feet by 114, and has a square embattled tower 120 feet high. St. Munchin's church, supposed to have been the former cathedral, is situated on an elevated open plot in the north of Englishtown, overlooking the Shannon. The Exchange was built in 1778, and has a commodious hall and handsome portico. The city court-house stands near the Abbey river; the county court-house, which stands towards the main stream of the Shannon on the west, is a very handsome building, and was erected in 1808 at a cost of 12,000*l.* It is quadrangular, built of hewn stone, and has a fine portico of four Roman Doric columns. The castle-barrack, constructed within the remains of King John's castle, at the eastern end of Thomond bridge, consists of three sides of a square, and has accommodation for 400 men. The chief public buildings of Irishtown are the corn and butter markets, and the linen-hall and the fever-hospital. At the southern extremity of the new bridge which leads from Englishtown into Newtown-Pery, facing the main river, is the new custom-house, a handsome structure, built in 1769, at a cost of 8000*l.* The Chamber of Commerce was erected in 1805. East of the new bridge, on Charlotte quay, is the assembly-house, built in 1770, at a cost of 4000*l.* It has recently been converted into a theatre. West of the new bridge from the area in front of the custom-house the quays extend round a basin included between the confluence of the Abbey river with the main stream of the Shannon and Wellesley bridge, which unites the new town with the opposite or Clare side of the river. The passage for vessels is by a lateral cut at the south end of the bridge, and west of Wellesley bridge the quays project irregularly into the river for a distance of about three-quarters of a mile, terminating at Kelly's quay, beside the gas-works, which bound the new town in that direction. Back from this line of quays the new town extends in a series of wide and elegant streets, crossing each other at right angles to the confines of Irishtown on one side, and to the new barracks, which occupy an elevated site above the gas-works, at the other. A handsome square has recently been built at the southern extremity of Harrington-street; and between George's-street and the Military Walk is an elegant crescent. In the southern suburbs of the town are the new county gaol and lunatic asylum. The former was erected in 1821, at a cost of 25,000*l.* It consists of a central polygonal tower, 60 feet high, surrounded by five diverging

ranges of prison buildings, and having a fine Doric entrance in front. The whole has a fine architectural effect. The lunatic asylum, opened in 1821, for 150 patients, cost a total sum of 29,856*l.* 11*s.* 5½*d.* It is a plain extensive collection of buildings, also on the radiating principle.

The port of Limerick is under the control of commissioners appointed by act of parliament in 1823. Their revenue averages 1500*l.* per annum, and they have obtained loans amounting to 55,384*l.* from government for the purpose of improving the river by the construction of floating docks. The plan adopted is from a design by the late Mr. Rhodes. It is intended to construct a weir across the river at Kelly's quay, with locks at each side, and a foot-bridge above. This would give a constant depth of from sixteen to eighteen feet in that part of the river extending from a little below Thomond bridge to the proposed dam. It is also proposed to deepen the river along its southern bank west of Wellesley bridge, and to convert the present irregular series of wharfs into one continuous line of quays. The estimated expense is 53,730*l.* 10*s.* The corporation are also at present engaged in rebuilding Thomond bridge, for which purpose they have procured a loan of 9000*l.* from the Board of Works. The estimate is 12,600*l.* Wellesley bridge above-mentioned was commenced in 1824, and cost 60,000*l.* It has five elliptical arches, each 70 feet in span, and a level roadway defended by an open balustrade. Baal's bridge has been recently taken down and replaced by a beautiful structure of a single arch. The Abbey river is also crossed by Park bridge, a little higher up.

Limerick is the head-quarters of the south-western military district, and, besides the barracks mentioned above, contains an artillery and infantry barrack in Irishtown; making, on the whole, accommodation for about 2000 men.

The trade of Limerick has increased with the growth of the city, though not in an equal degree. Being the natural outlet for the produce of a great part of the counties of Limerick, Clare, Tipperary, Cork, and Kerry, it has since the termination of the civil wars been, next to Cork, the chief seaport of Munster. In 1825 the exports consisted of 2654 tierces and 258 barrels of beef, 4417 tierces and 9100 barrels of pork, 19,750 cwt. of bacon, 65,000 firkins of butter, 61,000 barrels of wheat, 364,000 barrels of oats, and 12,500 barrels of barley. In 1835 there were exported of corn, meal, and flour 49,000 tons and 15 cwt., value 380,400*l.*; of provisions, 7705 tons and 15 cwt., value 337,200*l.*; of feathers 9 tons, value 900*l.*; of wine 850 gallons, value 470*l.*; of spirits 16,640 gallons, value 4200*l.*; of beer 5640 gallons, value 260*l.*; and of other commodities to the value of 3060*l.*: making a total value of exports of 726,430*l.* In the same year the imports amounted to a total value of 323,740*l.*; of which the chief items were, for tobacco 71,400*l.*, sugars 36,800*l.*, fish 25,800*l.*, tea 24,200*l.*, iron 23,490*l.*, and coal 21,000*l.* Limerick has also an extensive and increasing export trade through the Shannon and Grand Canal by way of Dublin.

Return of goods carried from Limerick and shipped at Dublin for Liverpool:—

	Wheat.	Flour.	Oatmeal.	Butter.
In 1833	187 tons	520 tons	543 tons	4,998 firkins.
1834	1,218	1,750	1,192	10,097
1835	402	5,269	533	10,771
1836	289	7,158	1,156	12,796

The gross freight from Limerick to Dublin, for grain or flour, is 15*s.* per ton, and the total distance 133 miles. There is also a very brisk passenger traffic on the same line, as well as from Limerick downwards. The number of passengers conveyed to and from Limerick by the navigation above the city, in 1836, was 14,600. The number of passengers carried to and from Limerick by the navigation below the city, in the same year, was 23,851. It is estimated that the total quantity of agricultural and other produce carried by inland conveyances into Limerick, in the year 1837, amounted to 232,000 tons, of which 60,000 tons were for exportation, and that the total quantity of goods carried by inland conveyances from the city, in the same year, was 32,400 tons, including 15,000 tons of imported goods. On the 5th of January, 1836, the number of vessels registered as belonging to this port was 71, of an aggregate registered tonnage of 5008 tons. The number of vessels which entered inwards from all parts, in 1835, was 548, of an aggregate tonnage of 66,184 tons; the number of vessels which cleared outwards, in the same year, was 592, of an aggregate tonnage of 70,327 tons. The customs for the year 1835 amounted to 142,636*l.* 11*s.* 8*d.*, and the excise duties for the same year to 71,616*l.* 6*s.* 6½*d.*

In 1831 there were, in the county of the city of Limerick, 9 brewers, 6 glovers, 18 paper-makers, 22 tanners, 198 weavers, 3 woolcombers, 1 bleacher, 3 flax-dressers, and 18 shipwrights. About 500 females are occupied in the manufacture of lace and tambour-work. The glove-trade, which was formerly carried on extensively, has now declined: most of the goods sold as Limerick gloves are manufactured in Cork. There are one large distillery, seven breweries, and some small iron-foundries and cooperages. The first steam-engine erected in Limerick was put up in 1818. There are twelve engines now at work in the city, of an aggregate power of 206 horse-power. There are branches of the Bank of Ireland, provincial, national, and agricultural and commercial banks, established in Limerick.

The city has been lighted with gas since the year 1824. The supply of water is from elevated tanks, to which the water is raised from the river by steam-power. The chief fuel is turf, of which 60,000 tons are annually consumed. The annual import of coal and culm is nearly 30,000 tons, but of this about one-half is for country consumption. The streets are well paved, particularly in the new town.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	4,900	..	..	..	..	..	..	40,000
1821	Under Act 55 Geo. III. c. 120	7,208	12,419	..	..	..	28,117	30,928	59,045
1831	Under Act 1 Will. IV. c. 19	7,820	11,953	2,798	4,057	5,098	30,414	36,140	66,554

In 1834 there were, in the parishes of St. Michael, St. Mary, St. John, St. Nicholas, and St. Munchin, which comprise the city, 37 day-schools, educating 1496 males and 1139 females. Of these one is a diocesan school for males, supported by contributions from the clergy of the diocese; four are parochial schools, supported by bequests and small payments; seven are free-schools, supported chiefly by private contributions; and two are in connection with the National Board of Education. The nuns of the Presentation Convent educate 320 females in their school, and a monastic society called the Christian Brothers educates 280 males. The nuns have a grant of 40*l.* per annum from the National Board. Besides the Brothers of the Christian Schools there are fraternities of Dominican, Augustinian, and Franciscan monks in the city, whose convents and chapels form prominent architectural objects. Since 1834 several large schools have been opened. There is a library of 2000 volumes attached to the Limerick Institution, which was founded in 1809. There are four newspapers published in the city, the number of stamps issued to which, in 1835, was 242,533.

The charitable institutions, beside the free-schools, are the county hospital; the house of industry, founded in 1774; the fever and Lock hospital, said to be the first fever hospital established in the United Kingdom, founded by Lady Hartstonge in 1781; the lying-in hospital, opened in 1812; Hall's almshouses, founded by Dr. Jeremy Hall in the early part of the last century; the corporation almshouse, for reduced widows; the St. George's widows' asylum; Mrs. Villiers's almshouses, also for widows, erected in 1826; and several other minor charities.

The grand-jury presentments for the county of the city,

for the year 1835, amounted to 6311*l.* 16*s.* 4*d.*, of which 3394*l.* 8*s.* 11*d.* was for buildings, salaries, &c., 525*l.* 10*s.* 4½*d.* for police, and the remainder for roads, bridges, and the repayment of government loans. The parish of St. Michael, which comprises the entire new town, is exempt from grand jury assessment. Its proportion of the general taxation is levied under the 47th and 51st of George III. The weight of taxation falls chiefly on the agricultural districts.

(Fitzgerald and Macgregor's *History of Limerick*, Dublin, 1826; Cox's *History of Ireland; Parliamentary Reports and Papers.*)

LIMERICK, a bishop's see, late in the archiepiscopal province of Cashel, and now in that of Dublin, comprises a large part of Limerick, and a small portion of Clare, extending 34 statute miles by 21 miles. The chapter is complete, having the five greater dignitaries and 11 prebendaries. The number of parishes is 88. In 1792 they constituted 47 benefices, and had 26 churches. In 1834 the number of benefices was 65; churches of the Establishment 42; other places of Protestant and Dissenting worship 7; Roman Catholic churches 78. In the latter year the population of the entire diocese was 257,700, of whom there were 11,122 members of the Established Church, 85 Presbyterians, 191 other Protestant Dissenters, and 246,302 Roman Catholics, being in the proportion of rather more than 21 Roman Catholics to one Protestant. In the same year there were in this diocese 231 daily schools, educating 11,475 young persons, being in the proportion of 5·23 per cent. of the entire population under daily instruction, in which respect Limerick ranks 26th among the thirty-two dioceses of Ireland. Five of the above schools in 1834 were in connection with the National Board of Education.

The see is said to have been founded by St. Munchin, whom some refer to the sixth and some to the seventh century. Little is known of the affairs of the diocese before the beginning of the twelfth century, when Gille or Gillebert, the first ecclesiastic who exercised legantine authority in Ireland, was bishop; he is stated to have been mainly instrumental in assimilating the Irish church to that of Rome. There is nothing of interest in the subsequent history of the diocese, which, in 1663, was united to that of Ardfert and Aghadoe. Some of the statistics of the latter are given under the head of Kerry. It comprehends the entire county of Kerry and a part of Cork, and comprises 86 parishes, constituting 49 benefices; it has 35 churches of the Establishment, eight other places of Protestant worship, and 88 Roman Catholic churches.

The see lands of the united diocese comprise 6720 acres, the annual revenue from which, on an average of the three years preceding 1832, was 5368*l.* 13*s.* 5*d.* The bishop's palace is situated in the new town of Limerick, overlooking the Shannon. This see is not affected by the 3 and 4 Will. IV., c. 37.

(Beaufort's *Memoir of a Map of Ireland; Parliamentary Reports and Papers.*)

LIMESTONE. This term is applied to a great variety of earthy compounds, in which carbonate of lime is the predominant ingredient. The chemical, molecular, and structural characters of limestone are extremely interesting to mineralogy, and deserve from geologists a greater share of attention than has usually been given to them. In regard to the chemical composition of limestones, we may notice that some, as statuary marble, are nearly pure carbonate of lime; others, as the dolomitic rocks of the Alps, contain a certain proportion of carbonate of magnesia; and some are penetrated by bituminous matter, as the black marbles of Yorkshire. Limestones also vary in quality, and become debased, by admixture with sand, clay, oxide of iron, pyrites, &c.; so that there is in fact a real gradation from limestone to schist, to sandstone, to shale, to ironstone, &c. Limestones have a crystalline aggregation, as statuary marble, and generally the limestones mixed with primary systems of strata; or they are composed of small crystalline grains, as the magnesian limestone of Mansfield in Nottinghamshire; full of round concretionary parts, as the oolites of Portland, Bath, and Oxford; earthy, as chalk, and some magnesian limestones; or compact, as the lithographic stone of Solenhofen. The limestone rocks of Building Hill, Sunderland, resemble a coral reef. The beds of calcareous rocks are of every thickness, from a mere lamina to some yards thick; they are traversed by divisional planes, more or less regular, and very thick beds assume a prismatic structure, as in Yorkshire. The colours of limestone vary indefinitely. When argillaceous matter is mixed with the calcareous basis of the rock, the colour generally approaches to blue; magnesian and oolitic limestones are often yellow; primary limestone and chalk are generally white; the Tiree marble is red; some of the Derbyshire and Kilkenny marble is black; and there are many veined and party-coloured marbles, as those of Babbacombe, Sienna, &c.

Limestones contain a very large proportion of the organic bodies which diversify the stratified rocks, few except the early primary limestones being wholly deficient of shells, corals, fishes, &c. Occasionally shells and zoophytes contribute to the beauty of particular marbles, as the shell marble of Carinthia, Purbeck, &c., the crinoidal marble of Derbyshire, and the coralliferous limestone of Weardale.

LIMIT; LIMITS, THEORY OF. The word limit implies a fixed magnitude to which another and a variable magnitude may be made as nearly equal as we please, it being impossible however that the variable magnitude can absolutely attain, or be equal to, the fixed magnitude. In this strict sense of the word there are two conditions which must be fulfilled before A can be called the limit of P: first, P must never become equal to A; secondly, P must be capable of being made as nearly equal to A as we please.

The method of limits is in reality nothing more than one way of evading the use of the word infinite in an absolute sense [INFINITE]: which may be shown as follows. If we take two common algebraical expressions, such as x and xx, or x^2, there can be no objection to saying that when $x = 7$, $x^2 = 49$, because 7 is a definite number, and the operation 7×7 is perfectly intelligible. And we may, if we please, say that when x approaches 7, x^2 approaches 49, so that if x may be made as near as we please to 7, x^2 can be made as near as you please to 49. Or, 7 being the limit of x, 49 is the limit of x^2. The preceding is superfluous, because it is more simple to say at once that x^2 *is* 49 when x *is* 7. But suppose that x, instead of being taken at pleasure, must be determined by means of y; and let the investigation of the relation between x and y lead to

$$x = 7 + \frac{1}{y}:$$

then, so long as y has any finite value, x must be more than 7; nor can the assertion $x = 7$ be made without the implication that y is infinite. In this case then we can only say that x can be made as near as you please to 7, if we may take y as great as we please; in which case x^2 can be made as near as you please to 49. In the language of the article infinite, we say (for abbreviation, as explained in INFINITE) that x is 7, and x^2 is 49, when y is infinite: in the language of the present article, we say that x *has the limit* 7, and x^2 the limit 49, when y *increases without limit.* We shall now translate the various illustrations given in the article just cited, from the language of infinites into that of limits. (pp. 471-2.)

When z is infinite, A is equal to B. If A be a fixed magnitude, read—If z increase without limit, A is the limit of B: if B be a fixed magnitude, read—If z increase without limit, B is the limit of A: if both A and B be variables, read—When z increases without limit, A and B approach to the same limit.

A finite quantity x, divided by an infinite quantity, is nothing. For this read—When the denominator of a fraction increases without limit, the numerator remaining the same, the fraction diminishes without limit.

Every circle is a regular polygon of an infinite number of sides. For this read—If the number of sides of a regular polygon inscribed in a circle be increased without limit, the polygon approaches without limit to the circle: or, the circle is the limit of all the regular polygons which can be inscribed in it.

When x is infinite, A and B are both infinite, but A is infinitely greater than B. For this read—When x increases without limit, A and B both increase without limit, but the ratio of A to B also increases without limit, or the ratio of B to A diminishes without limit.

When $x = a$, z is infinite. For this read—When x approaches without limit to a, z increases without limit.

Two infinitely great quantities may have a finite ratio. For this read—When two quantities increase without limit, their ratio does not necessarily increase without limit, but may have a finite limit.

Two infinitely small quantities may have a finite ratio: or—when two quantities diminish without limit, their ratio

does not necessarily diminish without limit, but may have a finite limit

When A is infinitely small, B is infinitely great For this read—When A diminishes without limit, B increases without limit.

An infinitely small arc of a curve is equal to its chord For this read—When the arc of a curve diminishes without limit, the ratio of the arc to the chord, or the fraction $\frac{\text{arc}}{\text{chord}}$, approaches the limit unity.

Of two infinitely small quantities, one may be infinitely smaller than the other For this read—When two quantities diminish without limit, it is also possible that their ratio may diminish without limit

Hitherto we have been dealing with purely verbal considerations These are not unimportant, since it is of great consequence that the fundamental notions of mathematics should be expressed in those terms which have always represented the rude and unrigorous form in which they are expressed in common life and also, when the form just alluded to has given birth to several different modes of expression, it is necessary to point out the connexion of these with each other, and to assimilate their defined meanings But, so far as demonstration is concerned we have made no step by using one form of words instead of another, or even by substituting the notion of a limit unattainable for that of the same magnitude attained by the supposition of absolute infinity The theorem by which rigorous results are obtained is the following —If two variable magnitudes A and B, be always equal, and if they have limits, namely, P the limit of A, and Q of B, then P and Q must be equal This proposition may seem almost self evident, it is not however a perfect axiom, and the method of exhaustions [GEOMETRY] was employed by Archimedes to prove it or rather, to prove the proposition that if two variable magnitudes be always in a given ratio their limits are in that ratio The latter form of the proposition is requisite in Geometry [PROPORTION] the former is sufficient in Algebra and the proof is as follows —Supposing A and B for instance to be varying lines always equal let their limits, if possible, be the unequal lines K L and M N.

K ——— ——— ——— – L

M— — — — — — N

Since A and B are equal and since the first can be made as near as we please to KL, and the second to MN, it follows that the latter pair are as nearly equal as we please But this is not true, since the limits are fixed and invariable magnitudes differing (if they differ at all) by a fixed and invariable quantity Consequently the limits cannot be other than equal The proof of the proposition of Archimedes is given in GEOMETRY, p 154

This proposition, being once understood, is more fruitful in applications than almost any other We shall give one instance from geometry and one from algebra

Circles are to one another as the squares on their diameters For this proposition is evidently true of the regular polygons inscribed in the two circles with the same number of sides, and the polygons may be made as nearly equal as we please to the circles The limits of the polygons then (or the circles themselves) are in that ratio which the polygons always preserve

As an instance from algebra, apply the BINOMIAL THEOREM to the development of

$$(1 + nx)^{\frac{1}{n}} = A,$$

which gives, by an easy transformation,

$$1 + x + \frac{1-n}{2}x^2 + \frac{1-n}{2}\cdot\frac{1-2n}{3}x^3 + \dots \quad \text{(A)},$$

a series which (by the method in CONVERGENT) is always convergent when nx is less than unity. Apply the same method to the development of

$$(1 + nx)^{\frac{y}{n}} = B,$$

which gives in the same manner

$$1 + yx + y\frac{y-n}{2}x^2 + y\frac{y-n}{2}\cdot\frac{y-2n}{3}x^3 + \dots \quad \text{(B)}$$

Now B is evidently A^y, and if when n diminishes without limit, B and A approach the limits P and Q, then B and A^y (equal quantities) will approach the limits Q and P^y, which are therefore equal. But the limit of A, when n diminishes without limit, is

$$1 + x + \frac{x^2}{2} + \frac{x^3}{2.3} + \dots \dots \quad = P.$$

That of B, on the same supposition, is

$$1 + xy + \frac{x^2y^2}{2} + \frac{x^3y^3}{2.3} + \dots \dots = Q$$

Hence the second of these series is the yth power of the first, a theorem which the algebraical student will recognise as one of the most important in that science

The *method of limits* generally means the Differential Calculus exhibited upon the principles explained in the article DIFFERENTIAL COEFFICIENT It is admitted, by a large majority of those who are capable of forming a judgment, that the method by which this theory should be established is either the method of limits, or that of Lagrange [FUNCTIONS THEORY OF], or a mixture of the two The number of those who contend for the second has very much diminished of late years, and the controversy (if such a thing can be said to exist) lies between the first and third The reader will find in the eighth number of the Treatise on the subject, published by the Society for the Diffusion of Useful Knowledge, some additional reasons for considering the use of assumed expansions as fallacious See also SERIES

It has been customary in elementary mathematical works to endeavour to postpone the theory of limits as late as possible Such an attempt can never be very successful, a clear understanding of the notion of a limit may easily be, and often is deferred *sine die*, but the necessity for such an understanding enters with the sixth book of Euclid. We shall even undertake to show [PROPORTION] that the fifth book cannot be properly understood without it

One of the best studies in the theory of limits is the first section of Newton's Principia In the article PRIME AND ULTIMATE RATIOS we shall present one or two of the leading propositions

LIMITATIONS, STATUTE OF [STATUTE OF LIMITATIONS]

LIMMA (λεῖμμα *a remainder*), in antient Greek music, is that which remains of the greater tone when the apotome is taken from it [APOTOME] The greater tone, as, for instance, C D, is divisible into nine commas, of these, five constitute the apotome, four the *limma* or, $\frac{5}{9}+\frac{4}{9}=\frac{9}{9}$

The ratio of the *limma* is $\frac{243}{256}$, and for all practical purposes it may be considered as the minor semitone of the modern scale

LIMNA'CEA [LIMNEANS]

LIMNE'ANS, *Lymnéens* or more properly *Limnéens*, in French (λίμνη, *limnē* a marsh, pool, or lake), Lamarck's name for a family of fresh water testaceous mollusks, consisting of the genera *Planorbis*, *Limnæa*, and *Physa* The family name now in general use is *Limnæidæ*

Two of these forms (*Planorbis* and *Limnæa*) were included by Linnæus under his great genus *Helix*, the third was arranged by him among the heterogeneous assemblage of testaceous animals, which he placed under his genus *Bulla* Muller separated the first of these under the name of *Planorbis*, and the second under the name of *Buccinum*, a name already pre occupied by Linnæus for a genus of marine testaceous gastropods entirely different and Lamarck changed the name to *Lymnæa*, or, as it should be more correctly written, *Limnæa* Adanson appears to have been the first who established the genus afterwards named *Physa* by Draparnaud, and the former gave it the appellation of *Bulin* Bruguieres followed Muller as far as regards *Planorbis*, but he placed the other two forms under his genus *Bulimus*, a name which we have reason to think owed its origin to the confused engraving of the word Bulinus, 'Le Bulin Bulinus,' on Adanson's plate (*Histoire Naturelle du Sénégal*, pl 1), the Latin word at first sight being liable to be mistaken for Bulimus (*Zool Journ*, vol iv, p 222, and the article BULINUS, vol vi)

Lamarck collected these three genera in the following order, *Planorbis*, *Physa*, and *Limnea*, under one family, his *Lymneens*, with the following definition —

Amphibian Trachelipods, generally deprived of an operculum, and having flattened tentacles. They live in fresh water, and come to respire the air at the surface.

Their shell is spirivalve, most frequently smooth on the external surface, and always having the right edge of its aperture sharp, and not reflected.*

The general opinion seems to be that these three genera are well associated in forming the family *Limnæidæ*.

Cuvier, though he gives them no common family name, places the three genera together, observing that the *Planorbes* are the faithful companions of the *Limnææ* in all our stagnant waters.

M. de Blainville makes his first family of *Pulmobranchiata* (*Limnacea*) consist of these three genera; and M. Rang, retaining Lamarck's name, places the '*Limnéens*,' consisting of the same genera, as the fourth family of the *Pulmonés Inoperculés* of Férussac (*Pulmobranches* of De Blainville).

Mr. G. B. Sowerby however is of opinion that the genera *Physa* and *Limnæa* ought not to be separated. He observes ('Genera. Limnea,' No. 8), that he finds himself obliged either to unite two genera which have appeared distinct to Lamarck and Draparnaud, and which have been adopted by some succeeding writers, or, contrary to his wishes, and, as he thinks, to the interests of conchological science, we must not only separate the *Physæ* from the *Limnææ*, but we must also adopt Dr. Fleming's *Aplexa*, and Dr. Leach's *Myxas*, each of which would, as far as we yet know, only contain one species. These, he adds, are all fresh-water shells; and the only describable difference in the shells, except mere specific differences, consists in the *Aplexa* and *Physa* being heterostrophe shells, while the *Limnæa* and *Myxas* are dextral. Greater differences he acknowledges are found in the animals, chiefly in their *tentacula* and in their mantles; the *Myxas* of Leach and the *Physa* of Draparnaud having the power of extending the edges of their mantle over a large portion of the external part of their shell, which the *Limnæa* of Lamarck and the *Aplexa* of Fleming have not, while the tentacula of all but *Physa* are compressed and triangular, and even in *Physa* they are compressed according to Lamarck, though filiform: in all of them the eyes are found at the internal base of the *tentacula*, supported on very short tubercular pedicles. He concludes by uniting the whole of these genera under the generic appellation of *Limnea*, and divides them into four sections, thus:—

1. *Shell* very thin, subglobose, polished; internal lip dilated; aperture ovate, dextral. *Animal* with the mantle reflected: the tentacles short and trigonal. *Myxas*, Leach's MS.; *Helix glutinosa*, Mont.; *Limnea glutinosa*, Drap.
2. *Shell* thin, obovate, polished; internal lip dilated, the aperture ovate or ovato-lanceolate, sinistral. *Animal* with the mantle reflected; the tentacles subulate. *Physa*, Lam.; *Bulla*, Linn.
3. *Shell* thin, oblong, polished; the internal lip equalling the external, the aperture lanceolate and sinistral. *Animal* with the mantle not reflected; the tentacles trigonal. *Aplexa*, Fleming; *Physa*, Drap.; *Bulla hypnorum*, Linn.
4. *Shell* thin, generally oblong, rather solid; the aperture oval and dextral, the inner lip equalling the external one. *Animal* with the mantle not reflected, the tentacles compressed and trigonal. *Lymnæa*, Lam.; *Helix*, Linn.

M. Deshayes rejects this opinion, and retains *Physa* as a genus, for reasons which the reader will find under that head in this article.

Returning to Lamarck, we find him remarking upon the cause which led to the peculiar organization of his *Lymnéens*, in accordance with one of his favourite fanciful theories. It would seem, says he, that those fluviatile Trachelipods, which inhabited waters of little depth, such as those of small rivers, ponds, and marshes, which are exposed to the accident of being dried up, were often reduced to live in mud more or less desiccated. They then found themselves forced to habituate themselves to the air, to breathe it.† This habit having modified their *branchiæ*, like those of the *Colimacés*, is become to them a matter of necessity; so that though living in the water, they are now obliged to come from time to time to its surface in order to breathe the free air. This circumstance in their manner of life seems to have had its influence in rendering an *operculum* useless to them; and they are in general deprived of one. Those fluviatile Trachelipods, on the contrary, which we know to be unable to respire anything but water, have all an operculum.

It is only necessary to reflect for a moment on the principle involved in these suppositions, to reduce them to their true value.

Leaving his theoretical views for his practical observations, we find Lamarck thus neatly pointing out a leading character for distinguishing the family. 'The Limneans have only two tentacles; they are flattened and never oculated at their summit.'

M. de Blainville thus defines his family *Limnacea*:—

Body very variable in form; two tentacles eminently contractile, carrying sessile eyes at the internal side of their base.

Shell delicate, with the external border constantly trenchant.

He further observes that the animals of this family are always found in fresh waters, stagnant or running, often at their surface, and sometimes in their depths. The shell, he remarks, presents very variable forms. He arranges the genera in the following order: *Limnæa*, *Physa*, *Planorbis*.

M. Rang gives a more extensive definition of the Limneans of Lamarck (*Limnacea* of De Blainv.; *Limnocochlides*, without a collar, of Latreille), thus:—

Animal elongated, having the *body* distinct from the foot, and twisted spirally backwards; never any *buckler* (or cuirass), but a *collar* formed all round the neck by the edge of the mantle; *head* surmounted by a sort of veil which is very large; *tentacles* two in number. the eyes differently situated at their base; *pulmonary cavity* showing its orifice upon the collar; *organs of generation* separated; *anus* near the orifice of the lung.

Shell always complete, very much rolled up (très enroulée), delicate, and with the external border or lip trenchant.

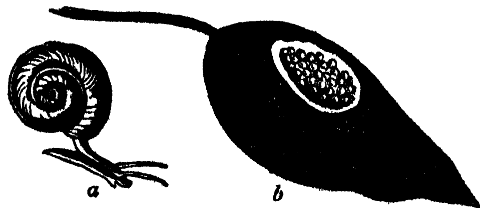
All fluviatile.

M. Rang arranges the genera in the following order. *Planorbis*, *Limnæa*, *Physa*. This is the order given by Cuvier, and, as far as these three genera are concerned, by Draparnaud, who however makes *Ancylus* intervene between *Planorbis* and 'Limneus.'

Planorbis.

Animal elongated, compressed, slender, and very strongly rolled up; head furnished with two tentacles, which are contractile, setaceous, very long, and oculated at their internal base; mouth furnished superiorly with a crescent-shaped tooth, and below with a lingual mass armed with small hooks, and surmounted by a sort of veil which is short and notched; foot oval and rather short; respiratory orifice on the left, upon the collar, and approximated by that of the anus; organs of generation separate, on the same side; the male organ near the tentacle, and the ovary at the base of the collar.

Shell rather delicate, sinistral, very much rolled or coiled up on the same plane; concave on each side, the spire reentrant (rentrant); aperture rounded with a sharp border, and interrupted by the convexity of the whorl which precedes it. (Rang.)



Planorbis. Shell and animal; and eggs.

a. Planorbis carinatus; *b*, mass of eggs of Planorbis corneus on a leaf.

Geographical Distribution.—Widely diffused. Very few fresh-waters, either running or stagnant, are without some of the species.

M. Rang remarks that the genus *Planorbis* offers a curious anomaly, namely, that the animal as well as the shell is sinistral, and consequently the orifices, instead of being situated on the right side, as in other gastropods, are placed on the left

* M. Rang says that he has sometimes seen a small internal 'bourrelet' on the right edge of certain species of *Physa* and *Limnæa*.

† See ante, LIMAX, p. [illegible]

Mr. Sowerby (*Genera*, No. 4) remarks that the principal peculiarity in this genus appears to him to consist in the fact that the shells of the genus are what are called reversed, a fact doubted by some, who have described the species as umbilicated above.* A careful examination of many of the species in a living state satisfied Mr. Sowerby that the animals carry their shells in a direction opposite to that of the generality of turbinated mollusks, and that the heart is placed in the *Planorbes* on the right side, and the respiratory orifice on the left, exactly the reverse of their position in most others. But, he further observes, the knowledge of the animal is not indispensably necessary to prove this, as the shell itself carries the demonstration, it being only needful to observe on which side of the shell the very apex of the spire is to be seen; if we take that side for the upper, in conformity to the strict rules of analogy, it will, he remarks, be evident that the aperture is on the left-hand side. Mr. Sowerby had for a long time entertained great doubt about the identity of some of the fossil species, which he is now satisfied are reversed shells, in the same manner as the other *Planorbes*, although the lower part of the disk is almost flat and carinated at its edge, and therefore bears a considerable resemblance to the flattened spire of some land shells, particularly the *Helix albella*.

Mr. Sowerby thus defines the genus:—Shell discoid with a depressed spire, whose apex is always distinct. its whorls turn from right to left, so that when the spire is held upwards and the aperture seen, it is on the left hand side. The shells are ventricose, frequently carinated, either above or below, the aperture is entire, its breadth equal to its length, sometimes greater but (Mr. S. believes) never less, sometimes the *peritreme*, or lip, is thickened and expanded, and its lower part is always extended forwards the umbilicus is very much expanded, and there is no operculum.

Mr. Sowerby further remarks that some species, particularly when young, are covered with a hairy epidermis.

M. Deshayes (ed. Lam., tom. viii., 1838) does not make any allusion to Mr. Sowerby's observations; but he comes to a very different conclusion. 'The *Planorbes*, says he, as all naturalists know, are discoid shells, generally delicate and fragile, found in abundance in stagnant waters. Some of the species are so much flattened that they seem perfectly symmetrical, so that it is difficult, in these last at least, to distinguish the upper surface from the lower. This difficulty brings with it another, namely, that of determining whether the species are dextral or sinistral. These interesting questions had not been deeply discussed when M. Desmoulins published (1831), in the Transactions of the Linnæan Society of Bordeaux, a well executed and very extensive memoir, in which he examines these different questions. 'In my preceding works,' continues M. Deshayes, 'I have not perhaps attached sufficient importance to those researches for which it was necessary to examine the living animals, but nevertheless in 1824 I disposed conchologically of a part of the difficulty by saying, in my work on the fossils of the Paris basin, that the upper side of the *Planorbes* may be distinguished from the lower by means of the obliquity of the aperture, the upper part of which is most prominent (avancé).' This mode of distinguishing the upper surface from the lower, and of placing the shell in its normal position, once granted, it becomes easy to recognise which species are dextral and which sinistral. By these means we perceive, as M. Desmoulins has very well demonstrated, that nearly all the known species of *Planorbes*, both living and fossil, are dextral, even those which the most esteemed authors had judged to be sinistral, from the depth of the umbilicus. But if by the observation of the aperture we come to the conclusion that the shell of the *Planorbes* is dextral, a difficulty presents itself, namely, that the animals which inhabit these dextral shells are sinistral, if we judge by the position of the three orifices which the pulmoniferous mollusks exhibit exteriorly. Thus Cuvier has well remarked this transposition of the orifices in *Planorbis corneus*, and has not hesitated to declare this species sinistral, contrary to the opinion of Linnæus, of Muller, and of Draparnaud, who state that the species is umbilicated above. Cuvier corroborates his opinion by an important fact, namely, that the heart is on the right side in *Planorbis*, whilst it is on the left in dextral shells of other genera: but Cuvier did not pay attention to the organs of digestion: finding the heart on the right and the orifices on the left, he came to the conclusion that *Planorbis corneus* is sinistral; he ought nevertheless to have seen, before he delivered this definitive judgment, in what real position the organs are. It is to this point that M. Desmoulins has especially applied himself, and he saw that all the organs of digestion and generation remain in the position which they hold in the dextral mollusks, and that the orifices only have an anormal position. Thus the observations of M. Desmoulins explain how, in the genus *Planorbis*, appearances place a sinistral animal in a dextral shell (a phenomenon which we cannot conceive), and how, in reality, the animal is dextral as well as its shell, and that there is no other derangement in the relationship of these organs excepting in regard to the heart, and the termination of the digestive organs and those of generation.'

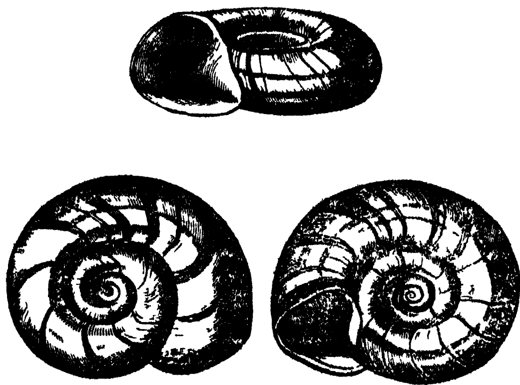
The species are numerous. Lamarck recorded twelve recent species, including *Planorbis Cornu Arietis*, which is not a *Planorbis*, but a discoid *Ampullaria* *, as its animal and operculum testify. M. Deshayes adds ten more in the last edition of Lamarck; Conrad, Troschel, and Broderip, have each described one in addition; and new species are brought home by almost every expedition. M. Rang states that he has known individuals of *Planorbis leucostoma* collected at Seize near Bordeaux, by M. Durieu, where the animals had closed the shell by a kind of *epiphragma* analogous to that of the *Helices*.

Example, *Planorbis corneus*; *Helix cornea*, Linn.

Description.—*Shell* opaque, plano depressed above, widely umbilicated beneath, of a horny or brown chesnut colour; the whorls transversely striated.

Locality.—This, the largest living species of Europe, if not the largest generally, is found in sluggish rivers and stagnant waters, such as old water-courses and drains in low swampy situations. Thus it is plentiful about Oxford. Montagu says that it is certainly more local than it is described to be by Da Costa, who states that it is common in all ponds, rivers, and lakes throughout England. This, adds Montagu, is far from being the case, although it is sufficiently plentiful in some parts, and he states that he never found it further westward than in Dorsetshire, where, about Wareham, it is abundant. Lamarck records it as an inhabitant of France in the rivers, and very common, about Paris, in that of Gobelins.

Montagu as well as others have observed that this species yields a beautiful purple dye (whence perhaps De Férussac's name *Planorbis purpura*), all attempts to fix which, either by acids or astringents, have hitherto proved ineffectual. The inside of the mouth of the *shell* in fine specimens is occasionally of a colour approaching to violet.



Shell of Planorbis corneus.

Physa.

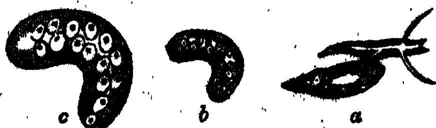
Animal of an oval form, more or less spiral; head furnished with two long tentacles, which are setaceous and oculated at their internal base; mantle with two lobes digitated on the edges, which can be turned back so as to cover a considerable part of the shell; the foot is long, rounded anteriorly, pointed posteriorly; the rest of the organization as in *Limnæa*, with the exception that the orifices are generally on the left.

Shell generally sinistral, oval, elongated or nearly globular, smooth, delicate, and very fragile; the aperture oval, a

* Draparnaud, among others, appears to have been of this opinion. See his figure of Planorbis corneus, &c., pl. i.

* Mr. G. B. Sowerby appears to have been the first who assigned the proper position to this species from observation of the shell only. (*Genera*, No. iv.) For this he was at the time undeservedly censured.

little narrowed behind; edge of the right lip sharp,* columella a little twisted, but without any plait; spire more or less sharp and elongated; the last whorl larger than all the others conjoined. (Rang.)



Physa. Shell and animal; with eggs.

a, Physa hypnorum; *b*, mass of eggs, nat. size; *c*, the same, magnified.

Geographical Distribution of the Genus.—Very extensive, species having already been found in the tranquil fresh-waters of all the four quarters of the globe. Europe has several species, and the form occurs in America, in Africa (there being little doubt that the *Bulin* of Adanson is a *Physa*), in New Holland, where it was found by M. Quoy, and in the Isles of Bourbon and France, whence it was brought by M. Rang. Mr. Gray has named two species from the East Indies and one from Peru.

Mr. G. B. Sowerby, as we have already seen, unites *Physa* and *Limnæa*, making the latter include the former for the reasons above given. M. Rang, who notices their inhabiting the same places as the *Limnææ*, and their resemblance in organization, observes that the animal of *Physa* is distinguished from that of *Limnæa* by the form of its tentacles, as is the shell by its generally sinistral disposition, like that of the *Planorbes*. He also notices the observation of M. de Blainville that there exist dextral species.

M. Deshayes, in the last edition of Lamarck (tom. viii., 1838), remarks, that the genus *Physa*, established at first by Adanson under the name of *Bulin*, was not definitely introduced till Draparnaud presented it anew under the name which it still bears. Adanson, he continues, had too much sagacity not to perceive the relationship of his *Bulin* with the *Planorbes*, and fails not to insist upon this point, although he points out the characteristic differences of the two genera. After some observations on the doubts of naturalists as to the analogy presented by the animals of *Planorbis*, and those of *Physa* and *Limnæa*, and the absence of doubt as to the distinguishing characters of the two last-mentioned genera, M. Deshayes thus continues: 'Certainly, if we consider the shells only, there is a very great resemblance between a *Physa* and a *Limnæa*, but all the *Physæ* are sinistral, the *Limnææ* are dextral; the *Physæ* have a polished and shining shell, because the animal has its mantle lobated and turned back upon the shell, which is not the case in *Limnæa;* the animal of *Physa* carries on its head elongated and narrow tentacles, like those of *Planorbis*, and not triangular and thick ones, like those of *Limnæa*. These characters seem sufficient to retain the two genera in the system, and, consequently, to reject the opinion of Mr. Sowerby, who unites them in his genera.'

Lamarck recorded four species of *Physæ* (recent). M. Deshayes, in the last edition of the 'Histoire,' increases the number to ten; and he regrets that M. Michaud has given no detail with regard to some species indicated as found in France, but which do not appear to live there. He observes that Lamarck has recorded two *Physæ* (*P. castanea* and *P. subopaca*), the first from the Garonne, and the last from the environs of Montpelier, which M. Michaud does not mention. M. Deshayes adds, that we must probably conclude, from the silence of M. Michaud, that these species have not been found, and that Lamarck, deceived by a false indication, has given them a *habitat* not theirs. Conrad has described an additional species.

Example, *Physa fontinalis*, Drap.; *Bulla fontinalis*, Linn.

Description.—*Shell* sinistral, oval, diaphanous, smooth; of a yellowish horn-colour; spire very short and rather pointed.

Locality, temperate Europe, probably; England and France, certainly.—North America (Claiborne, Alabama), Conrad.

Habits, &c.—Col. Montagu (*Testacea Britannica*) notices this species as not uncommon in stagnant pools, as well as running waters, in many parts of the kingdom, and as most frequently found on the under part of the leaves of aquatic plants. He gives a description of the animal, and says that when in motion it covers a great part of the shell with a thin pinnated membrane, thrown out on the right side, extending quite behind and partly on the left side, covering the smaller volutions: this membrane (mantle) a, he says, very deeply divided, or digitated, the points of which meet and sometimes intersect on the back of the shell, and it is so transparent as scarcely to be distinguished but by the assistance of a glass. The foot he describes as long and narrow, and the foramen on the left side, 'as must be the case with all the animals of this kind inhabiting *heterostrophe* shells.' Col. Montagu concludes his remarks on this species as follows: 'It has a very considerable locomotive power, and transports itself by adhering to the surface of the water, with the shells downwards: against which it crawls with as much apparent ease as on a solid body; and will sometimes let itself down gradually by a thread affixed to the surface of the water, in the manner of the *Limax filans* ('Linn. Trans.,' iv., 85, t. 8.), from the branch of a tree. The property of crawling under water, against its surface, is not wholly confined to this species;* but we know of no other testaceous animal capable of supending itself under water in the same way.† It has the power of throwing its shell about in an extraordinary manner, either in defence or to remove obstructions, continuing at the same time fixed by its foot. Probably this singular motion is sometimes occasioned by a minute species of *Hirudo* (*Gordius inquilinus*, Müll., *Verm.*) which infests this and many other fresh-water testaceous animals; twenty or more may be seen adhering to its sides like slender white filaments.'

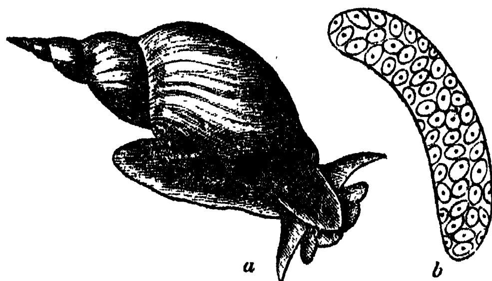


Shell of Physa fontinalis.

Limnæa.

Animal of oval form, more or less spiral; head furnished with two flattened triangular tentacles, carrying the eyes at their base, on the internal side; mouth furnished with an upper piece for mastication, surmounted by a sort of very short veil; foot oval, bilobated anteriorly, narrowed posteriorly; orifice of the pulmonary cavity on the right side, on the collar, in form of a furrow, and capable of being covered by a fleshy appendage which borders it below; anus on the side, organs of generation distant, the orifice of the male intromissive organ being under the right tentacle, and that of the vagina at the entry of the pulmonary cavity.

Shell delicate, fragile, of an oval oblong, with a spire more or less sharp and elongated, and an aperture longer than it is wide, oval, sometimes very large, with a sharp edge,‡ not continuous, on account of the convexity of the preceding whorl; on the columella an oblique plait. (Rang.)



Limnæa stagnalis.

a, the animal in the shell; *b*, mass of eggs, magnified.

M. Deshayes observes (last edition of Lamarck) that the animal of *Limnæa* presents peculiar characters. On the head are two triangular tentacles very much enlarged at the base, and having the eyes rather projecting on the upper and internal part of that base. The head is large and flattened, separated from the foot by a shallow furrow. The foot inclines to oval, terminated in a point posteriorly, and delicate and flattened on the sides. The mantle, closed anteriorly and narrow, forms a sort of collar, as in the *Helices*. There is a great cavity behind its border. The upper wall of this cavity, delicate and transparent, is covered on its internal surface by a very well developed vascular net-work, destined for respiration: it is near the aperture of the

* See above: note to description of the shells of the Limnæans, p. 498.

* See post, Limnæa.

† See post, Lymnopa, which is said to have a similar power.

‡ See note at the commencement of the article, p. 498.

mantle and a little below it that the orifice of the anus is seen.

Geographical Distribution of the Genus.—*Limnææ* appear to occur in almost all parts of the world, but the form is most seen in the temperate and northern regions.

Habits, Food, Reproduction, &c.—Fresh-waters, especially those which are stagnant, are the resort of the *Limnææ;* in such situations they abound, feeding on the aquatic plants on whose stems they creep, and coming to the surface to respire the air. Here they may often be seen in a reversed position, and probably maintained in it by the air in the branchial cavity. Like the *Physæ* they have the power of locomotion when so situated, and may be observed moving their ventral disk, as if they were employing it against a solid surface, whereas the animal only touches an extremely thin lamina (so to speak) of water, which offers sufficient resistance for its progression. In the reproduction of the species the animals are employed somewhat differently from the *Helicidæ* and *Limacidæ*, though, like them, each individual is furnished with both male and female organs of generation; for the same *Limnæa* is capable of serving at the same time as a male for a second, and as a female for a third, and by this connexion of one individual with two others a continuous chain of some length is not unfrequently produced. No. 2313 of the fifth or allotriandrous series of preparations illustrating the principles of generation, in the Museum of the Royal College of Surgeons in London (*Catalogue*, vol. iv., 'Physiological Series'), exhibits the soft parts of the generative anal and respiratory orifices of *Limnæa stagnalis*, and shows how this gastropod differs from the *Limacidæ* and *Helicidæ* in the separation of the above-mentioned orifices from one another. The number of eggs is very great, and they are deposited on stones, stems of vegetables, &c., in elongated masses enveloped in a glairy substance, which is said to increase in proportion to the development of the embryos. For very interesting details on the reproduction and embryogeny of these mollusks we refer the reader to the works of M. Pfeiffer and of M. Dumortier.

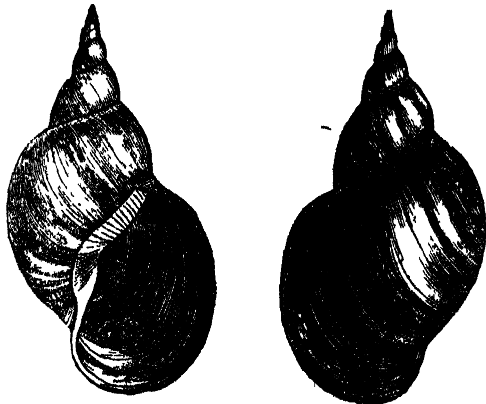
The recent species are numerous; Lamarck recorded twelve, including *L. columnaris*, which is considered to be an *Achatina*. M. Deshayes, in the last edition of Lamarck's 'Histoire,' has added eight more. Bean and Troschel have each added one.

We select as examples *Limnæa stagnalis* and *Limnæa auricularia*.

Limnæa stagnalis.—This is *Helix stagnalis,** Linn.; *Buccinum stagnale*, Müll.; and *Bulimus stagnalis*, Brug.—*Description:*—*Shell* ovato-acute, ventricose, thin, pellucid, substriated longitudinally, of a horny colour; the last whorl subangulated above; the spire conico-subulate; the aperture large.

Montagu observes that it is frequently covered with a green epidermis, and sometimes a concreted stony matter that almost obliterates the upper volutions; he adds that some authors have made this shell into two or three species, apparently from size only.

Locality, The fresh sluggish or stagnant waters of England, France, &c.



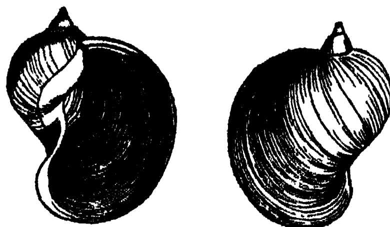
Limnæa stagnalis.

Limnæa auricularia.—This is *Helix auricularia*, Linn.; *Buccinum Auricula*, Müll.; *Bulimus auricularius*, Brug.

* 'Syst. Nat.,' ed. 12, p. 1249, No. 703. On the opposite page (1248) the specific name *stagnalis* is again given to a small and apparently different shell.

Description:—*Shell* ampullaceous, ventricose, ovate, thin, transparent, of a horny colour, marked with very delicate close-set longitudinal striæ; the spire very short and acuminated.

Locality, the same with that of *L. stagnalis*.



Limnæa auricularia.

Fossil Limnæidæ.

Planorbis.—M. de Blainville ('Malacologie') mentions the number of fossil species as four or five, adding that Defrance, who increases the number to eighteen, acknowledges that the fossil state of some of them is doubtful; he notices four as analogues. Mr. G. B. Sowerby (*Genera*) states that several fossil species abound in the distinctly fresh-water strata of the Isle of Wight and the neighbourhood of Paris, where they are very abundant, and accompanied by as great a profusion of *Limnææ* and some other decidedly fresh-water shells.

Lamarck records only three fossil species, nor does he mark any of the recent species as occurring in a fossil state. M. Deshayes, who in his tables (Lyell) makes the number of species 23 living and 26 fossil (tertiary), records in the same place the *Planorbes corneus, marginatus, carinatus, spirorbis*, and *nitidus* as both living and fossil (tertiary). We cannot find *P. marginatus* in Lamarck's first edition nor in that edited by M. Deshayes (tom. viii.) in 1838, except as a synonym to *P. complanatus*. In this last work the following recent species are marked by M. Deshayes as occurring in a fossil state:—*corneus, spirorbis, vortex, contortus, nitidus, complanatus*, and *Leucostoma*, on the authority of M. Bouillet; and the number of fossil species is made to amount to nine. Dr. Fitton, in his 'Stratigraphical and Local Distribution of Fossils,' in the strata below the chalk, notices an indistinct species of *Planorbis*, (Purbeck, Oxfordshire and Bucks).

Physa.—M. de Blainville, in his *Malacologie*, states that it would appear that no *Physæ* had at the time of his publication been found fossil. M. Deshayes in his tables (Lyell) gives the number of species as nine living and one fossil (tertiary): in the last edition of Lamarck the number of recent species given is ten; but the number of fossil species is the same as that stated in the tables.

Limnæa.—M. de Blainville (*Malacologie*) remarks that if it were clear that the species of this genus established by geologists, and among others by MM. Lamarck, Brard, Brongniart, Sowerby, and De Férussac, were true, there would be at least twenty fossil species in France alone; but he adds that M. Defrance does not carry the number further than ten, two of which (from the Plaisantin) are analogues according to Brocchi. Mr. G. B. Sowerby, who unites the genera *Physa* and *Limnæa*, observes ('Genera') that several fossil species of this genus occur abundantly in company with various *Paludinæ* and *Planorbes* in the fresh-water formations; these, he adds, occur in the neighbourhood of Paris, and in the upper and lower of these formations at Headen Hill, and in other parts of the Isle of Wight. He also found them sparingly 'in the mixed stratum commonly called the upper marine formation, between the two,' but he believes that they do not occur in any other. Lamarck noticed but one species as fossil, viz. *Limnæa palustris*, this being in his opinion really the analogue of the recent species of that name. M. Deshayes in his tables (Lyell) gives the number of *Limnææ* as fifteen living and twenty-seven fossil (tertiary), and the species *peregra, auricularis, rivalis*, and *palustris* as both living and fossil (tertiary). In the last edition of Lamarck the following recent species are marked by him as also occurring in a fossil state:—*palustris, ovata, peregra*, and *minuta*. *L. auricularia* is not marked as fossil in this edition, and we do not find *L. rivalis* as a species in either. The number of strictly fossil species recorded in the last edition of Lamarck is eleven, and in that edition M. Deshayes remarks that a sufficiently great number of *Limnææ* are

found in a fossil state, but that up to the time when he wrote no species was recorded in the beds below the tertiary, and even in these the *Limnææ* only appear in the lower fresh-water strata. They show themselves, he adds, in the upper beds of the Paris calcaire grossier, and are also recognised in nearly all the lacustrine deposits, not only of the Parisian epoch, but also in the two great tertiary groups that surmount it. Dr. Fitton, in the table above quoted, records a *Limnæa* (with a note of interrogation) as occurring in the Purbeck strata, Oxfordshire, in the 'malm,' Garsington.

Mr. Lea, in his 'Contributions to Geology' (8vo. Philadelphia, 1833), notices the tufaceous lacustrine formation of Syracuse, Onandaga county, New York. He found the substratum which lined the side of the canal to consist of a calcareous marl of a whitish colour, bordering on that of ashes, friable, and rather soft to the touch. A subsequent analysis by Professor Vanuxem proved it to be nearly pure carbonate of lime. Numerous perfect specimens of the genera *Limnæa*, *Physa*, *Paludina*, and *Ancylus* were obtained, all being analogous to the species inhabiting at that time the fresh-waters of that region; and Mr. Lea states that it was evident that the deposit was caused by the drainage of the lake. The specimens were found to be completely bleached, and were generally in an unbroken state. 'A lacustrine formation of so recent a nature,' says Mr. Lea in continuation, 'as this appears to be, is not, I believe, of frequent occurrence. It is the result however of one of those causes which are now in action; and another instance might be mentioned, in which the effect of this cause, though striking, has not advanced to that period when it would make a finished deposit; I mean the small lake, or pond, in Sussex county, New Jersey, well known by the descriptive name of Milk Pond *. Here countless myriads of bleached shells of the families *Lymnæana* and *Peristomiana*, analogous to the species now inhabiting the adjacent waters, line and form the shores of the whole circumference of the lake, to the depth and breadth of many fathoms. Not having visited this interesting lake myself, I repeat what has been communicated to me by intelligent scientific friends who have examined it, and on whose report the most implicit reliance may be placed. Such is the quantity of bleached shells now remaining there, that thousands of tons of these small species, in a state of perfect whiteness, could be obtained if any useful purpose required the removal of them. For agricultural purposes this mass might prove of great utility. One friend, I remember, mentioned to me that he had obtained a sharp pointed pole, which he inserted ten or twelve feet perpendicularly into the mass, on the shore, near to the edge of the water, without its having passed through it. As far as can be ascertained, this mass seems to form the whole basin of the lake, and it may at some future and perhaps not far distant period form a tufaceous lacustrine deposit similar to that of Syracuse.'

LIMNO'RIA. [Isopoda, vol. xiii., p. 63.] In 1838 the Rev. F. W. Hope exhibited to a meeting of the Zoological Society a piece of deal perforated throughout by *Limnoria terebrans*, in which many of these destructive crustaceans might still be detected; and he stated that the oaken piles of the pier at Southend had been cased with deal, and then surrounded with a sheathing of iron, to protect them from the *Limnoriæ*. Instead of producing the desired effect, this plan appeared to have accelerated the destruction of the piles; for the *Limnoria* made its way from beneath between the sheathing and the pier, and very quickly destroyed the deal casing, as shown by the piece exhibited. Mr. Hope expressed his belief that wood could not by any means be effectually shielded from this animal if exposed to its attack; and that iron, protected from the decomposing action of the water by some varnish, although requiring a much greater outlay at first, would in the end be found the least expensive of the two. (See further, *Edinb. New Phil. Journal*, 1834 and 1835.)

* From the milky appearance of the waters near the shore, caused by the mass of bleached shells deposited there. In Gordon's map of New Jersey it is named *White Pond*. (Lea.)

LIMOGES, a city in France, capital of the department of Haute (Upper) Vienne; situated on the right bank of the Vienne, 215 miles in a direct line S.S.W. of Paris, or 236 miles by the road through Orléans and Châteauroux. Limoges was the chief town of the Celtic tribe the Lemovices, to whom both the town and the province of Limousin owe their names. It was called Augustoritum by the Romans, under whom it was a place of considerable importance, and became in the third century the seat of a bishopric. It was at the convergence of several Roman roads. There was an amphitheatre, said to have been built by the emperor Trajan, of which there were sufficient remains in 1713 to admit of a plan being drawn; it was about 1500 feet in circumference. It was entirely destroyed in 1714, in order to form the Place d'Orsay. There are now no Roman remains at Limoges in good preservation, except a subterraneous aqueduct, which conveys the water of a fountain in the upper part of the town. In the fifth century Limoges came into the power of the Visigoths; and was successively pillaged or destroyed by the Franks (twice) and Northmen. It was ceded to the English by the treaty of Bretigny, and formed part of the great duchy or principality of Aquitaine under Edward the Black Prince. [Bordeaux.] The people of Limoges were persuaded by their bishop to revolt from Edward, one of whose last exploits (A.D. 1370) was the capture of the town. Irritated by treachery, the Prince, who was then wasting under the disease which ultimately brought him to his grave, put three thousand of the inhabitants, men, women, and children, to the sword; the bishop, who had been ordered for execution, was released by the intercession of the Pope.

Limoges is built on a hill which commands a prospect of the delightful valley of the Vienne. The older part of the town consists of narrow and steep streets, with houses, from the first floor upwards, built of wood: the more modern part contains broad and straight streets, the handsome 'Place d'Orsay,' several excellent houses, new boulevards, and a number of public fountains. Of the public edifices the principal are the town-hall, a handsome modern building; the cathedral, a fine Gothic edifice of the thirteenth century; and the episcopal palace. The population was, in 1831, 23,804 for the town, or 27,070 for the whole commune; in 1836 it was 29,706 for the whole commune. The chief manufactures are of broad-cloth, kerseymere, drugget, flannel and other woollen goods; cotton-yarn and calico; linen and hempen cloth; hosiery, both cotton and woollen; paper, leather, hats, glue, wax candles, and porcelain. There are dye-houses for wool and cotton, and several iron-works. The Vienne is not navigable here; but the position of the town on one of the high roads from Paris to Perigueux and Bordeaux and into Spain, and to Cahors and Toulouse, is favourable to inland trade, of which it has a good share. There are roads to Poitiers, Angoulême, and Clermont Ferrand. There is a great monthly market or fair for cattle, and nine yearly fairs, two of which last eleven days each. There is an Exchange for the convenience of traders.

Limoges is the seat of a Cour Royale, or high court of justice, and of an Académie Universitaire; the circuit or jurisdiction of both which comprehends the departments of Haute Vienne, Corrèze, and Creuse. There is a mint. It has a royal college or high school, and a diocesan seminary for the priesthood; a royal society of agriculture, sciences, and arts; a drawing-school, a school of commerce, and a museum of natural history and antiquities; three public libraries; a depository of objects of art and mechanical science, and a departmental nursery-ground. There are a mont-de-piété, several benevolent institutions, and a central house of correction.

The arrondissement of Limoges comprehends 780 square miles: it had a population of 115,488 in 1831, and in 1836 of 120,476. It is subdivided into ten cantons, two which are in and just about Limoges, and 78 communes.

The diocese of Limoges comprehends the departments of Creuse and Haute Vienne; the bishop is a suffragan of the archbishop of Bourges.

LIMO'SA. [Scolopacidæ.]

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